JETR

JOURNAL OF
EXERCISE THERAPY
AND REHABILITATION

Journal of Exercise Therapy and Rehabilitation. 2021;8(1):44-53

ORIGINAL ARTICLE

Effects of brace on pedobarographic parameters in individuals with adolescent idiopathic scoliosis

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Purpose: The aim of the study was to evaluate the immediate effects of brace on static, dynamic and stabilometric changes in individuals with Adolescent Idiopathic Scoliosis (AIS).
Methods: Twenty-nine AIS individuals (24 girls; 5 boys) aged between 10-19 years and have moderate curve (20-45°) included into the study. Static, stabilometric and dynamic data of the individuals were recorded by the DIASU pedobarography device (Diasu Company, Rome, Italy 4024 sensor, 300 MHz frequency). Assessments were carried out on same individuals in-brace and without-brace conditions. All data were recorded with Milletrix software (Diagnostic Support, Rome, Italy) and transferred to computer system.
Results: There were no differences between with in-brace and without-brace conditions on static and stabilometric values ($p>0.05$). However, it was found that braces affected dynamic values such as footstep length and foot acceleration on the left side ($p<0.05$). It was observed that these values decreased with using braces.
Conclusion: Immediate effects of bracing could change dynamic pedobarographic variables such as acceleration and step length. Regarding short-term effects of bracing on dynamic parameters, therapists and orthotists should consider the compensatory effects of bracing through the rehabilitation.
Keywords: Braces, Scoliosis, Gait analysis.

Adolesan idiopatik skolyozlu bireylerde ortezin pedobarografik parametreler üzerine etkisi

Amaç: Çalışmanın amacı, adolesan idiopatik skolyozlu (AİS) bireylerde skolyoz ortezinin statik, dinamik ve stabilometrik değişimleri üzerine anlık etkilerini değerlendirmekti.
Yöntem: Çalışmamıza 10-19 yaş aralığında ve orta derecede eğriliğe (20-45°) sahip olan 29 birey (24 kız, 5 erkek) dahil edildi. DIASU (Diasu Company, Rome, Italy 4024 sensor, 300 MHz frequency) pedobarografi cihazı ile bireylerin statik, stabilometrik ve dinamik verileri kaydedildi. Değerlendirmeler aynı bireylerde ortezil ve ortezsiz durumlarda gerçekleştirildi. Veriler Milletrix yazılımı (Diagnostic support, Rome, Italy) ile kayıt altına alındı ve bilgisayar sistemine aktarıldı.
Bulgular: Ortezli ve ortezsiz durumda yapılan analizlerde statik ve stabilometrik değerler arasında değişiklik saptanmadı ($p>0,05$). Bununla birlikte, Ortezin sol ayak adım uzunluğu ve sol ayak ivme gibi dinamik değerleri etkilediği bulundu ($p<0,05$). Ortez kullanımıyla beraber bu değerlerde azalma görüldü.
Sonuç: Skolyoz ortezinin anlık etkileri ivme ve adım uzunluğu gibi dinamik pedobarografik değerleri değiştirebilmektedir. Ortotist ve fizyoterapistlerin, skolyoz ortezinin dinamik parametreler üzerindeki kısa dönem etkilerini dikkate alarak, rehabilitasyon süresince ortezin kompansatuar etkilerini göz önünde bulundurmaları gerekmektedir.
Anahtar kelimeler: Ortez, Skolyoz, Yürüme analizi.

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Received: September 14, 2020. Accepted: March 8, 2021.

Scoliosis is one of the most progressive common deformities of the spine which is characterized by lateral deviation, axial rotation, and thoracic hypokyphosis.[1,2] Although the etiology of Adolescent Idiopathic Scoliosis (AIS) is not clearly explained; genetic factors, muscle, bone, connective tissue problems, and neurological disorders are related factors known that lead to scoliosis.[3]

Structural changes in ribs and vertebrae affects spinopelvic alignment in AIS.[4] Besides structural changes, body asymmetry in scoliotic subjects may affect whole vertical posture and postural sway as a result of changing in center of mass.[5-7] Studies on how distribution of body asymmetry in lower limbs changing in AIS revealed that there is a relation between hip joint movements ratios and the Cobb angle. In addition, increase in femoral anteversion and significant changes in radiological morphology of pelvis were found in scoliotics.[8-11] Related problems with AIS were reported as postural instabilities in body sway and asymmetries in gait parameters such as step length and duration in stance phase.[6,12] Further, there were asymmetries observed between right and left side in loading and unloading rates in the vertical, anterior–posterior, and medial–lateral component of the ground reaction forces.[13-15] Motion restriction in pelvis, hip, and shoulder joints in frontal plane; hip joints in transvers plane and knee joints in sagittal with bilaterally prolonged activation timing of Quadratus Lumborum, Erector Spinae, Gluteus Medius, and Semitendinosus muscles were detected via 3-dimensional (3D) kinematic analysis.[12] Previous studies on gait deviations in AIS reported differences in spinal electromyographic activity of the erector muscles and a side-to side asymmetry of trunk kinematics.[16,17] To summarize, the literature suggests walking speed, cadence, step length, range of motion in lower extremity joint, ground reaction force symmetry and energy expenditure were affected in AIS. Conversely, most of the studies in comparing scoliosis patients with healthy controls concluded no significant differences in walking speed, cadence and step width.[10] Consequently, there is no consensus on the how postural balance and gait parameters change in AIS.[17-19]

Among various approaches, orthotic treatment of scoliosis is one of the most frequently preferred conservative methods in AIS.[20,21] International Society on Scoliosis Orthopaedic and Rehabilitation Treatment (SOSORT) guideline in 2011 stated that brace applications varied on different biomechanical approaches and characteristics of design.[2] Although different types and designs of braces are available, overall goal of these braces is to control in curve progression.[20,21] Milwaukee brace is one of the commonly used for the patients with apex of curve above T8 and reported that have a therapeutic effect with part-time wearing.[22,23] Other common orthotic treatment for scoliosis is Boston brace aims to correct the scoliotic curve passively was found effective when used 18 hours or more hours per day in preventing progression of curves between 35º-45º.[23] Although the aim of orthotic treatment of scoliosis is curve progression control, differently from other brace applications, it was proved that Chêneau brace provide to correct the curvatures in some cases.[24,25] Chêneau-type brace was designed to oppose the spinal torsion and correct curve in 3D correction of the trunk and spine.[26] The modified version of the Chêneau, Rigo System Chêneau brace, is a corrective device uniquely constructed to provide corrective forces via placements of the pads in 3D correction in brace design.[2] Rigo-Chêneau-type brace aims to supply trunk and spine into the best possible postural and morphological 3D corrected alignment by using a combination of forces applied to the trunk surface by specifically designed pads, facilitated by expansion or escaping spaces.[26] Based on the structural properties of the spinal deformity in AIS, the most acceptable approach is applying 3D correction in brace design in the literature,[26] that's why we preferred to use Rigo System Chêneau brace in our study.

Many researchers demonstrated biomechanical effects of brace on spine; however, it is crucial to find out and interpret the outcomes related with postural balance and gait parameters. Outcomes regarding functional parameters of lower extremities may lead to understand different aspects of brace.[27] Various results were reported on effectiveness of braces such as providing stabilization, supporting in symmetrical gait pattern and decreasing cadence.[28,29] On the other hand, there are studies put forward different aspects of the brace on long and short term in individuals with AIS; their outcomes are still controversial in the literature. For instance, regarding plantar pressure and postural control parameters, these studies reported that brace may influence the movements on the pelvic, trunk and hip movements and these changes lead to enhance the improvement in symmetrical stability in standing and movement pattern gait.[10,28,30,31]

Scoliosis Research Society announced the importance of the patient's compliance together with the technical aspects of treatment.[32,33] Recent technology presents brace manufacturing with Computer Aided Design and Computer Aided Manufacturing (CAD-CAM). CAD-CAM design supplies various advantages in terms of time, energy and material saving in application and compliance for users.[34-36] The studies related with CAD-CAM brace focused on different effects of scoliosis such as correction rate of the brace and progression of curvature, balance of the brace on sagittal and coronal planes, patient's preference and comfort.[37,38] There are only few studies assessing postural balance and gait parameters in individuals with the AIS evaluated the immediate effect of the braces manufactured by the manual method on the postural balance and gait parameters.[28,29,39] For the further contribution to literature, this present report focuses on the immediate effects of the CAD-CAM braces on plantar pressure and postural control-balance parameters. We aimed to evaluate the immediate effects of the braces on static, dynamic, and stabilometric changes of individuals with AIS.

METHODS

Subjects

Twenty-nine patients (24 girls and 5 boys, age; 13.9 years) with AIS were included into this study. Inclusion criteria for subjects with idiopathic scoliosis were age 10 to 19 years and having moderate (Cobb angle: 20°-45°) curve. The exclusion criteria were having any previous history of neurological, orthopedic or rheumatic diseases. In addition, patients with discomfort affecting walking parameters for any reason such as surgery, having contractures were excluded from the study.

The Non-Interventional Research Ethical Committee of the Istanbul Medipol University approved this study (approval number: 722, date: 25/09/2019). The study was conducted in accordance with the principles of the Declaration of Helsinki and written informed consent obtained from all subjects and their legal guardians. All participants were informed about the aim of the study.

Brace application

The manufacturing process, which started by measuring with a scanner, was continued with production in the mill unit after special design was made in accordance with the deformities and treatment protocols of the AIS patients. The manufacturing process consists of four stages naming as digitization, rectification, milling, and molding.

1. Digitization Stage starts with "8-second scanning process" on participant. At this step, the data scanned from the body transferred to the computer.

2. Application of bracing continues with *Rectification Stage* by using CAD-CAM software Rodin 4D (SAS, Pessac, France). While giving the model final shape, various biomechanical principles could be considered depends on severity of the curve and type of the curve.

3. Milling Stage: Foam model created in a three-dimensional structure.

4. Molding Stage: The milled-rectified model was covered with a polyethylene thermoplastic 5 mm thick. After the thermoplastic was shaped trimming and finishing processes are performed.[40] All these procedures for the braces were fabricated by the same certified orthotist.

Rigo System Chêneau brace design

"Rigo System Chêneau (RSC)" brace design was applied to all participants. RSC brace is a thoracic-lumbo-sacral orthosis provides the best possible 3D correction with the pads are located, shaped, and oriented in a highly specific manner to push on selected regions of the trunk. RSC brace is designed in asymmetrical shape and because the areas of expansion or escaping spaces are not touched by the brace, this brace do not have full-contact property. The pad areas were located, shaped, and oriented to provide a combined deflection-derotation effect, while the expansions had to provide the necessary room for tissue migration, growth, and breathing movements. The necessary detorsional forces to achieve the 3D correction with this static brace could be explained with three mechanism: 1. Three-point systems in the frontal plane; 2. Pair-of-force for regional and local derotation and 3. Correct balance and physiological alignment in the sagittal plane.[26] Braces were designed as to as allow breathing, supporting lumbar lordosis and not disturbing the patient while sitting.

Measurements

At the beginning of the study, demographic information including age, gender, height, body mass, and properties for AIS such as curve pattern and Cobb angle were recorded. All the assessments were completed and detailed information about the study given by the same researcher (first author Y.A.). Pedobarographic assessment includes static, stabilometric, and dynamic analysis were performed under two conditions: in-brace and without-brace. The immediate effect of brace on plantar pressure recorded to the computer via Milletrix (Diagnostic Support, Rome, Italy) software integrated with the system.

Assessments

The angle of curvature was determined by the Cobb method to evaluation of curvature and measuring the angle.[41] In this study, the Cobb angles of the patients were measured on radiographs and recorded in degrees. Spinal curvatures of participants were classified according to the King classification. King classification system includes five types of curve definitions based on the location of the curve apex and flexibility on X-Ray as follows: Type 1: double curve, lumbar curve larger and stiffer than the thoracic curve; Type 2: double curve, thoracic curve larger and stiffer than the lumbar curve; Type 3: single thoracic curve; Type 4: long thoracic curve with L4 tilted into the curve; and Type 5: double thoracic curve.[42] Consequently, there were 8 patients in King 1, 6 patients in King 2 and 16 patients in King 3 classification.

Pedobarographic analysis

Pedobarography devices allow to evaluate individuals under static and dynamic conditions. In addition, this system is approved as an objective measurement that examines the body's postural control, balance and stabilization.[43] This system is widely used by clinicians and researchers to analyze foot structure and determine load and unload values on foot.[43,44] In this study, pedobarographic analysis of participants were performed by pedobarography device (DIASU, Diasu Company, Rome, Italy 4024 sensor, 300 MHz frequency) which are 5 m long and 40 cm wide and Milletrix software (Diagnostic support, Rome, Italy).

Pedobarographic assessment includes 3 different analyzes: static, stabilometric, and dynamic. The data obtained during the analyzes were transmitted to the computer via software integrated with the system.[44]

Static analysis

Participants were positioned with the aid of the apparatus in the region determined on the platform and requested to stay in barefoot standing position with opened-eyes position for 10 sec. Forefoot-rearfoot weight ratio (%), forefoot-rearfoot and total plantar contact surface (cm^2), maximum pressure (kg/cm^2), mean pressure (kg/cm^2), foot angle (°) and foot angle axis values were recorded.

Stabilometric analysis

Stabilometric Analysis contains to evaluate postural control and balance. Participants were positioned same as in the static analysis. Normal values and abnormal deviations were detected. Participants were asked to remain on the standing posture for 52 sec in both opened-eyes and closed-eyes conditions. Ellipse area (mm^2), latero-lateral (L-L), and antero-posterior (A-P) mean acceleration, sway length (mm) values recorded.

Dynamic analysis

Dynamic Analysis includes walking 5 rounds in natural walking pattern. Forefoot-rearfoot-total loading (kg), total plantar contact surface (cm^2), mean pressure (kg/cm^2), maximum pressure (kg/cm^2), acceleration (m/s^2), step length (cm), cadence (step/minute) and step width were obtained while walking.

Statistical analysis

Statistical power analyses were used to determine the optimum sample size by using trunk sway in closed-eyes condition.[45] As a result of the power analysis based on the primary outcome, it was decided to conduct the study with a minimum of 20.[45] The alpha level used in determining the sample size was 0.05, and the ideal power was considered to be 80%. Effect size (Cohen's d) value was calculated and

0.8 was accepted according to the reference. Values between 0.2 and 0.5 were accepted as small, 0.5–0.8 as medium and over 0.8 as large effect sizes.[46]

"Statistical Package for Social Sciences" (SPSS) Version 22.0 (SPSS inc., IBM Corp., Armonk, NY, USA) was used in the data analysis of this study. Descriptive statistics were reported for continuous variables using mean and standard deviations (SDs) and for categorical variables using counts. For all data sets, the Kolmogorov-Smirnov test of normality was used to determine whether the distribution of values was normal ($p>0.05$) or not normal ($p<0.05$) and to indicate whether parametric or non-parametric statistical analysis should be used to analyze test results. According to the Kolmogorov-Smirnov test results, there was not anormal distribution of data. Wilcoxon Signed Rank Test was used to reveal the difference between the two dependent variables. A level of significance of $p<0.05$ was accepted for the study.

RESULTS

Demographic and clinical characteristics of all participants presented at Table 1.

According to static analysis, there were not any differences between in-brace and without-brace conditions on gait parameters such as weight ratio, contact surface, maximum and mean pressure, foot angle, and foot angle axis (Table 2), ($p>0.05$).

Stabilometric analysis were compared for both opened-eyes and closed-eyes conditions (Table 3). No statistical difference was found ($p> 0.05$).

Dynamic analysis of participants for both conditions were presented on Table 4. According to these results, braces did not affect the loading and plantar pressure values. However, there were found some relevant statistical differences related with gait parameters. According to these analyses, acceleration of the left foot and step length of the left side decreased with brace ($p<0.05$).

Table 1. Demographic and clinical characteristics of the participants (N=29).

	Mean±SD
Age (years)	14±1.5
Height (cm)	159.8±6.9
Body weight (kg)	46.7±8.1
Body mass index (kg/m^2)	18.2±2.9
Cobb angle (°)	
Thoracic	36.8±6.7
Lumbar	30.7±6.5
	n (%)
Gender (n, %)	
Female	24 (83%)
Male	5 (17%)
Curve pattern (n, %)	
KING 1	8 (27.5%)
KING 2	6 (20.6%)
KING 3	15 (51.7%)

DISCUSSION

The aim of this study was to evaluate immediate effects of braces, which were manufactured by CAD/CAM method. Previous studies represent show that spinal curvature can affect body biomechanics and balance by creating asymmetry and accordingly it may change the distribution of load and pressure.[47,48] In our study, pedobarographic assessment of individuals with AIS were performed in-brace and without-brace conditions. This study showed that braces can affect instantly gait patterns such as acceleration, step length even if they do not cause significant changes in the upright posture. Since the brace application procedures involve long-term follow up, immediate effects of the braces should be detected and considered.

Pedobarography systems are commonly used in clinical and scientific studies to investigate the biomechanical changes and their effects.[43,44,49] There are studies in the literature investigating the effects of the braces on the gait parameters however, the manufacturing methods of these braces could be manual or CAD-CAM.[10,18,30,31] Gur et al. reported that bracing did not change static parameters, however, they declared that the brace wearing created a more symmetrical gait pattern during walking.[28] Differently from the Gur et al., we applied the braces in CAD-CAM

Table 2. Comparison of the static analysis in-brace and without-brace in patients with scoliosis.

	Without-Brace Mean±SD	In-Brace Mean±SD	z	p
Fore foot weight ratio (%)				
Right	28.1±11.5	25.6±9.6	-0.973	0.331
Left	31.2±12	29.0±12.6	-0.843	0.399
Rear foot weight ratio (%)				
Right	71.8±11.5	75.1±10.2	-1.319	0.187
Left	69.9±13.2	70.8±14.1	-0.638	0.524
Fore foot plantar contact surface (cm^2)				
Right	14.5±6.1	14.1±5.8	-0.260	0.795
Left	13.2±5.6	12.9±5.4	-0.168	0.866
Rear foot plantar contact surface (cm^2)				
Right	19.7±5.7	20.7±5.8	-1.060	0.289
Left	17.2±5.5	17.6±6.5	-0.249	0.804
Total plantar contact surface (cm^2)				
Right	53.5±6	53.9±7	-0.897	0.369
Left	46.4±6	46±7	-0.897	0.369
Maximum pressure (g/cm^2)	1681.7±396.5	1662.5±399.6	-0.465	0.642
Mean pressure (g/cm^2)	765.9±147.6	752.3±149.2	-0.606	0.545
Foot angle (°)				
Right	5.6±4	5.8±4.4	-0.043	0.965
Left	4.9±5	6.9±5.1	-1.838	0.066
Foot angle axis				
Right	8.4±5.9	7±5.7	-0.670	0.503
Left	5.5±5.4	7.8±6	-1.860	0.063

Table 3. Comparison of the stabilometric analysis in-brace and without-brace in patients with scoliosis.

	Without-Brace Mean±SD	In-Brace Mean±SD	z	p
Eyes open				
Ellipse area (mm^2)	102.9±168	106.3±179.2	-0.011	0.991
L-L mean acceleration (mm/s)	2.9±1.2	2.8±1.3	-0.616	0.538
A-P mean acceleration (mm/s)	1.7±1.1	1.8±1.5	-0.433	0.665
Sway length (mm)	195.2±81.7	182±111.9	-0.551	0.581
Eyes closed				
Ellipse area (mm^2)	119.1±279	100.5±160.2	-0.011	0.991
L-L mean acceleration (mm/s)	2.6±1.5	2.8±1.8	-0.054	0.957
A-P mean acceleration (mm/s)	1.8±1.2	2±1.8	-0.595	0.552
Sway length (mm)	187.7±108.7	190.7±149	-0.389	0.697

L-L: Latero-Lateral, A-P: Antero-Posterior.

Table 4. Comparison of the dynamic analysis in-brace and without-brace in patients with scoliosis.

	Without-Brace Mean±SD	In-Brace Mean±SD	z	P
Total loading (kg)				
Right	55.2±9.7	51.9±6.9	-1.697	0.090
Left	44.7±9.7	48±6.9	-1.697	0.090
Total plantar contact surface (cm^2)				
Right	45.8±14.2	43.1±11.9	-0.941	0.347
Left	39.2±14.5	41.5±12.3	-0.898	0.369
Mean pressure (g/cm^2)				
Right	1110.6±402.4	1170±391.1	-0.832	0.405
Left	1374.6±693.1	1207.9±287.2	-0.595	0.552
Maximum pressure (g/cm^2)				
Right	1888.7±787.9	1918.7±628.3	-0.270	0.787
Left	2105±844.9	2013.4±526.8	-0.551	0.581
Acceleration (cm/s)				
Right	86.3±39.3	78.6±18.5	-1.549	0.121
Left*	88.6±39	73.4±19.6	-2.995	0.003*
Step length (cm)				
Right	50.3±4.7	48.3±6.9	-1.806	0.071
Left*	50.3±9.2	46.8±8.8	-2.746	0.006*
Cadence (step/minute)				
Right	56.4±32.2	52±17.1	-1.150	0.250
Left	57.9±32.6	52.3±17	-0.934	0.350
Step width				
Right	10.5±4.5	11.1±5.8	-0.249	0.804
Left	9.1±5	10.4±5.5	-1.082	0.279

* $p<0.05$

method; on the other hand, we found similarly that static parameters did not yield statistically significant in-brace condition. We may explain these outcomes into two perspectives. First, patients may lead to correct their own body or trunk asymmetry with various compensatory mechanism in upright position. That is why, the static analysis may not reveal any differences depending on the presence of the compensatory mechanism. Secondly, Negrini et al. emphasized that patients should use the brace in long enough time to provide adaptation to their brace.[32] For this reason, long-term effects could give us more accurate information about these pedobarographic variables.

According to the results of the stabilometric analysis, observing the effects of braces on postural stability and postural control parameters, no statistically significant difference was found between in-brace and without-brace both open and closed eyes conditions. Similarly to our study, Paolucci et al. demonstrated that there were differences in stabilometric parameters between in-brace and without-brace conditions; however, these differences were not statistically significant. Further, in-brace and opened-eyes conditions, (A-P) and (L-L) oscillations were significantly reduced compared to the reference values.[29] Another study showed that bracing did not change stabilometric values significantly and the authors emphasized that this may be due to the clinical characteristics of the participants such as curve patterns, age and bone maturity.[28] Our results determined that bracing did not create significant changes on stabilometric variables. Similarly, we consider that this situation depends on the variable clinical characteristics of the participants. Further, since we did not include healthy individuals in our protocol, we could not compare the results with reference values.

There are various studies searching the effects of the bracing on gait patterns and kinetic and kinematic changes during the walking in scoliosis. According to our outcomes, both parameters of cadence and speed of gait were not affected following using the brace. Karimi et al. demonstrated that bracing reduced the range of motions of pelvic, trunk, hip, and knee joints during walking.[39] Additionally, reduced asymmetry index of sagittal pelvic, knee, ankle, frontal pelvic and hip, and transversal hip and knee ranges of motion were determined during walking. They concluded that the usage of the braces in patients with scoliosis affects the walking pattern in a way that increases symmetry. However, the results were not statistically significant.[39] Similar results were observed in the study of Gur et al.[28] The authors noted that individuals in-brace conditions had more symmetrical plantar pressure distributions during walking. In addition, it was reported that cadence and walking speed decreased with bracing. The authors considered this situation as an adaptive mechanism towards to the brace.[28] Similarly, Paolucci et al. noticed that the bracing lead to decrease in walking speed and cadence.[29] Differently from these outcomes, Kaviani et al. reported that cadence did not change significantly in conditions with and without bracing.[50] We considered that the reason why walking speed is effecting may be due to the long term using of braces would limit the movement of the trunk, pelvis and the hip as a result of the compensatory reaction. In addition, because our study aimed to evaluate the instant effects of braces, the adaptation of the patients for the brace may not be achieved.

On the other hand, while the plantar contact surface value decreased on the right side and it was increased on the left side in-brace condition; however, these were not yielded any significant results. Further, step width did not change in-brace condition. Lastly, our study showed that the left foot acceleration and step length of the left side reduced in-brace condition. In the literature, there are several studies found different results in these parameters, unfortunately there is no consensus on these variables.[28,29] We consider that these asymmetric differences seen on the right and left sides may be related to the curvature patterns of the participants and may be a compensatory mechanism developed by the body towards to the curvature. Alternatively, we consider that braces lead to limit the spine and pelvis excessively; that could be one of the reasons why the static and stabilometric parameters were not affected.

Limitations

Some limitations determined in our study. Firstly, although the target group of our study was individuals with AIS, the participation of healthy individuals in this study could enable us to determine the reference values. Secondly, we could only evaluate the immediate effects of bracing. Future studies may consider that the long-term effects of the bracing would support crucial information regarding the compliance of bracing. Finally, we could compare conservative and CAD-CAM bracing. In the future studies, there is a need to compare different manufacturing designs of the braces on pedobarographic outcomes and gait parameters to make affective clinical decision.

Conclusion

In conclusion, our study showed that the bracing, which is manufactured by CAD-CAM method, did not affect the static and stabilometric values of individuals with AIS, but change dynamic variables such as acceleration and step length. Regarding the immediate changing of the dynamic parameters, therapists and orthotists should consider the compensatory effects of the bracing through the rehabilitation.

Acknowledgement: The authors would like to thank the Istanbul Medipol University Scientific Research Projects for supporting our work, and Bilim Orthotics Prosthesis Application Center for providing the opportunity to conduct the study.

Authors' Contributions: YA: Concept development, data collecting, data analysis, providing the cases, writing; **BD:** Concept development, data collecting, data analysis, providing the cases, writing, project management, critical review; **YY:** Concept development, data analysis, project management, critical review.

Conflict of Interest: *None*

Funding: *None*

Ethical Approval: The protocol of the present study was approved by The Non-Interventional Research Ethical Committee of the Istanbul Medipol University approved this study (approval number: 722, date: 25/09/2019).

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