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Association Between Lower Extremity Arterial Disease and Various Sitting Positions

ORIGINAL INVESTIGATION

ABSTRACT

Background: Lower extremity arterial disease is usually a widespread vessel disease of atherosclerotic origin with a predisposition for certain anatomical sites. This study aimed to evaluate the relationship between lower extremity arterial disease anatomic and clinical features and various sitting patterns.

Methods: Patients who underwent invasive peripheral angiography and who were diagnosed with lower extremity arterial disease in a single tertiary center were included in the study. Six sitting positions were defined. Sitting patterns and other clinical data were collected using a standardized questionnaire.

Results: In this study, 150 patients diagnosed with lower extremity arterial disease who underwent invasive peripheral angiography were enrolled. The mean age of the study population was 66.2 ± 9.5 years, and an overwhelming majority of the participants were men (91.3% vs. 8.7%). A significant relationship was found between sitting positions #1-5 and right-sided lesions, as well as sitting positions #1-4 and left-sided lesions (sitting position #5 and right-sided lesions $P = .039$, all others $P < .001$). Longer and more frequent sitting conditions were found to be associated with lesions in the proximal arteries (common iliac artery and external iliac artery) but not in the more distal artery (superficial femoral artery, popliteal artery, anterior tibial artery, and posterior tibial artery) lesions.

Conclusions: A clear relationship between sitting positions and lower extremity arterial disease sites was demonstrated. This data indicate that sitting patterns should be evaluated in every lower extremity arterial disease patient.

Keywords: Peripheral artery disease, artery lesion, sitting positions

INTRODUCTION

Lower extremity arterial disease (LEAD) is a heterogenous disease of both macro- and microvasculature with significant cardiovascular prognostic implications.[1] Lower extremity arterial disease has a wide spectrum of clinical presentation, ranging from an asymptomatic decrease in distal perfusion pressure to life-threatening limb ischemia. Lower extremity arterial disease symptoms are known to have an association with position and physical activity: patients prefer a dependent position to alleviate pain during claudication, and claudication occurs mainly during intense physical activity. The former is a result of increased blood flow in dependent position when compared to horizontal position.[2] It is thought that gravitational forces govern increased intravascular pressure during dependent position which leads to flow-mediated vasodilation and therefore increases the blood flow, a finding that is confirmed by measuring skin perfusion pressure during various postural positions.[3] On the contrary, the increased demand that cannot be met by a limited increase in supply leads to claudication during intense physical activity.

Clearly, the association between postural position and lower extremity blood flow exists. Moreover, studies on atherogenesis pathophysiology have shown that blood flow dynamics and local flow pattern alterations predispose to focal irregular lesion progression.[4,5] Since vessels are elastic structures rather than stiff tubes, different sitting positions alter bifurcation geometry, local pressures, and therefore increase the blood flow, all of which may predispose to difference in

Muhammed Asfour
Emir Baskovski
Kerim Esenboğa
Deniz Kumbasar

Department of Cardiology, Faculty of Medicine, Ankara University, Ankara, Turkey

Corresponding author:
Emir Baskovski
emirbaskovski@gmail.com

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atherosclerosis progression patterns. In this study, we investigate the relationship between various sitting positions, their frequency and duration, and anatomical substrates, as well as clinical data in patients with angiographically confirmed LEAD.

METHODS

This cross-sectional study aiming to investigate the relationship between LEAD anatomical substrate and various sitting positions was conducted in a single university center, between June 1, 2019, and January 1, 2020. In this study, 150 patients with angiographically confirmed LEAD were enrolled. The study complies with ethical principles defined by Declaration of Helsinki. The study protocol was approved and supervised by the local ethical committee. Written informed consent was obtained from all study participants.

Data Collection

All patients received a standardized questionnaire (Table 1) for each of the defined sitting positions (Figure 1). Patients were required to select 1 of the 4 sitting position frequency (A-D) options, provide duration in minutes for E, and answer F-G with + (yes) or – (no).

Clinical data were collected from electronic patient files. Thereafter, peripheral angiography images were examined by an interventional cardiologist experienced in interventional LEAD treatment. The patients were classified according to vessel side involvement (i.e., left, right, or bilateral). Angiographic signs of LEAD were assessed in the following vessels: common iliac artery (CIA), external iliac artery (EIA), superficial femoral artery (SFA), popliteal artery (PA), anterior tibial artery (ATA), and posterior tibial artery (PTA). Lower extremity arterial disease lesions were graded in the following manner:

- grade I: lesion length 0-2 cm,
- grade II: lesion length 3-10 cm,
- grade III: lesion length >10 cm, and
- total occlusions were graded as grade IV.

Statistical Analysis

Statistical analyses were performed using a Statistical Package for Social Sciences version 20.0 software (SPSS Inc., Chicago, Ill, USA). Data are expressed as numbers and percentages for discrete variables and as mean ± standard deviation for continuous variables. Nominal variables were compared using chi-square and Fisher's exact tests. All probabilities are 2-tailed and $P < .05$ was considered significant.

HIGHLIGHTS

- Lower limb peripheral artery disease anatomy has an association with various sitting positions.
- Specifically, increasing sitting frequency in certain positions is associated with an increased incidence of ipsilateral iliac lesions.
- The therapeutic effects of changing sitting habits should be explored.

Table 1. Standardized Questionnaire

	Leg/Position
A. I never sit in this position.	
B. I rarely sit in this position (less than 5 times per day).	
C. I moderately frequently sit in this position (5-10 times per day).	
D. I frequently sit in this position (>10 times per day).	
E. Maximal duration during still sitting in this position.	
F. Do you feel pain during sitting in this position?	
G. Do you feel tingling or numbness when sitting in this position?	

RESULTS

In total, 150 patients were enrolled in the study. The mean age of the study population was 66.2 ± 9.5 years, and an overwhelming majority of the participants were men (91.3% vs. 8.7%). Lower extremity arterial disease involving right limb only was present in 32.7% (49) patients, left limb-only involvement was present in 36.6% (55) patients, and 30.7% (46) patients had bilateral involvement. Other baseline characteristics are presented in Table 2. Anatomical characteristics of LEAD vasculature in the study population are presented in Table 3. The frequency and duration of sitting positions, as well as associated symptoms (pain and tingling), are presented in Table S1.

Right and left-sided vasculature involvement in LEAD according to investigated sitting positions is provided in Tables 4 and 5, respectively. Briefly, an association between any right-sided lesions and increasing frequency in right sitting positions #1-5 was observed ($P < .001$, $P < .001$, $P < .001$, $P < .001$, and $P = .039$, respectively). Specifically, a significant association between increasing frequency of the defined sitting positions and right-sided CIA, EIA, and SFA lesions was observed (except EIA lesions in sitting position #5) (Table 4). No difference was observed in lesions for PA, ATA, and PTA among different right-sided sitting position frequency (Table 4).

Similar observations were made for left-sided lesions in left sitting positions (Table 5). An association between left-sided lesions and increasing frequency of sitting in sitting positions #1-4 ($P < .001$, $P < .001$, $P < .001$, $P < .001$, respectively) was observed. Furthermore, there was a significant relationship between the frequency of left sitting positions #1, #2, and #4 and left CIA lesions, as well as the frequency of left sitting positions #1-4 and #6 and left SFA lesions. Other findings are reported in Table 5.

DISCUSSION

In this study, we have observed a statistically significant relationship between various sitting positions and the presence as well as the anatomy of lower extremity LEAD. In this predominantly male study population, right- and left-sided

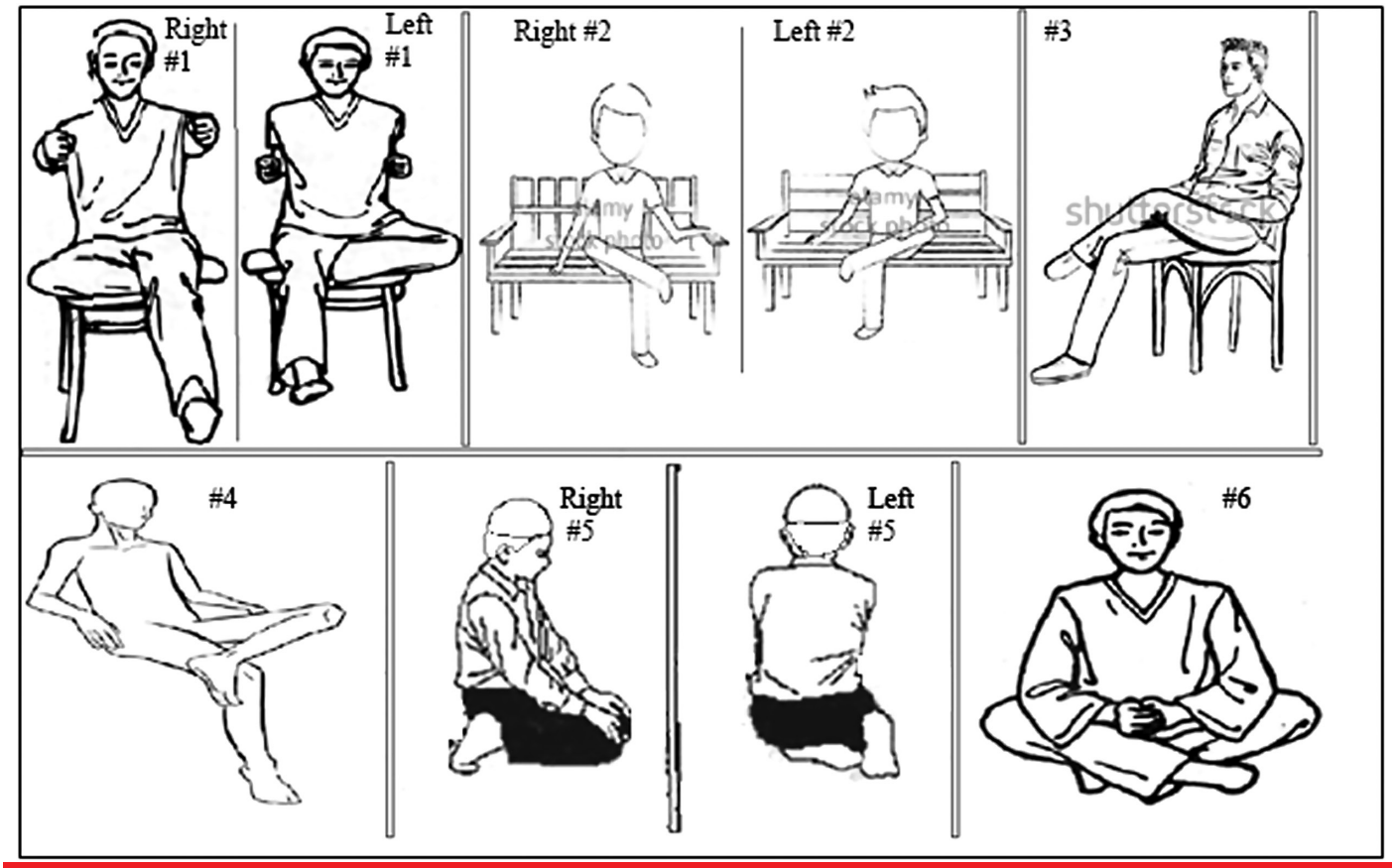

Figure 1. Visual representation of sitting positions #1-6 is depicted in the figure.

Table 2. Baseline Clinical Characteristics	
Age (years)	55.7 ± 8.9
Sex, n (%)	
Female	13 (8.7)
Male	137 (81.3)
Limb, n (%)	
Right	49 (32.7)
Left	55 (36.6)
Bilateral	46 (30.7)
Hypertension, n (%)	130 (86.7)
Diabetes mellitus, n (%)	52 (34.7)
Coronary artery diease, n (%)	83 (55.3)
Currently smoking, n (%)	17 (11.4)
Atrial fibrillation, n (%)	14 (9.3)
Carotid artery disease, n (%)	20 (13.3)
History of stroke, n (%)	5 (0.3)

lesions were of similar frequency, and most lesions were above the knee. While the association between defined sitting position frequency and presence of lesions was generally observed for above the knee vasculature, no difference was observed for below the knee vasculature, albeit, the absolute number of the latter was small, which may have led to an under-presentation.

Although atherosclerosis is a widespread systemic process, it does not uniformly affect the vasculature. Predisposition of specific vascular sites for accentuated atherosclerosis is determined by extensive list of factors, one of which is endothelial shear stress (ESS).[6] The differential endothelial phenotype to local shear stress is thought to result in an atherosclerotic phenotype where outer edges of bifurcation lesions are involved. Since ESS is determined by local blood flow characteristics, mechanical factors may lead to a differential atherosclerotic profile. This provides a rationale for our observations. Although vessels are very elastic, compression and angulation occur during various sitting positions, therefore leading to differential local ESS. For example, in sitting positions #1 and 2, severe angulation in CIA/EIA may lead to low ESS in the corresponding arteries. Lower ESS, predisposes to endothelial dysfunction, including apoptosis results in plaque progression.[7] Previous studies have demonstrated that by blood flow-induced shear stress, prolonged sitting may predispose to "sitting vasculopathy."[8,9] It was previously shown that prolonged sitting was associated with impaired flow-mediated dilatation in SFA but not in the brachial artery, further implicating postural mechanical factors in lower extremity blood flow regulation.[10] Acute metabolic differences have been observed between patients with prolonged sitting positions and those with regular activities.[11] However, there is no published study assessing clinical and anatomical relations between

Table 3. Peripheral Artery Disease Anatomical and Clinical Characteristics

Artery	Right, n (%)	Left, n (%)
CIA		
Not present	120 (80)	126 (84)
EIA		
Not present	134 (89.3)	135 (90)
Present	16 (10.7)	15 (10)
Grade I	5 (31.3)	4 (26.7)
Grade II	11 (68.8)	11 (73.3)
Grade III	0 (0)	0 (0)
Grade IV	0 (0)	0 (0)
SFA		
Not present	89 (59.3)	79 (52.7)
Present	61 (40.7)	71 (47.3)
Grade I	0 (0)	0 (0)
Grade II	27 (44.3)	25 (34.7)
Grade III	9 (14.8)	18 (25)
Grade IV	25 (41)	29 (40.3)
PA		
Not present	146 (97.3)	141 (94)
Present	4 (2.7)	9 (6)
Grade I	0 (0)	0 (0)
Grade II	4 (100)	4 (44.4)
Grade III	0 (0)	3 (33.3)
Grade IV	0 (0)	2 (22.2)
ATA		
Not present	142 (94.7)	139 (92.7)
Present	8 (5.3)	11 (7.3)
Grade I	0 (0)	1 (9.1)
Grade II	4 (50)	5 (45.5)
Grade III	2 (25)	3 (27.3)
Grade IV	2 (25)	2 (18.2)
PTA		
Not present	144 (96)	141 (94)
Present	6 (4)	9 (6)
Grade I	0 (0)	0 (0)
Grade II	3 (42.9)	4 (44.5)
Grade III	4 (57.1)	2 (22.2)
Grade IV	0 (0)	3 (33.3)

CIA, common iliac artery; EIA, external iliac artery; SFA, superficial femoral artery; PA, popliteal artery; ATA, anterior tibial artery; PTA, posterior tibial artery.

various sitting positions and their frequency, to the best of our knowledge.

In this study, we have observed a clear association between sitting and CIA/EIA/SFA lesions. Since aortoiliac lesions are associated with a worse prognosis compared to other lower extremity LEAD, this observation seems to be of particular importance. Although we did not find similar statistical significance for below the knee lesions, the low incidence of those precludes definitive association.

In addition to anatomical relation observed in our study, there is evidence that as time spent in the sitting position increases, symptoms related to limb ischemia increase, probably due to anaerobic metabolism.[12] Our study supports this observation since the incidence of symptoms during various sitting positions is relatively high.

Our study inherits the limitations of the observational study design. Since data were obtained by patient interrogation, a bias may have occurred; however, in our opinion, it is not very likely primarily due to the simplicity of the interrogation. Furthermore, our findings are statistically very consistent for above the knee lesions which signal a clear association between findings.

CONCLUSION

We have demonstrated an association between various sitting position frequency and ipsilateral LEAD anatomy. These data imply that sitting positions and duration may be another aspect in LEAD management, and in the future, advice to avoid positions that lead to increased LEAD or LEAD symptoms may be given, as well as after angioplasty to decrease restenosis; however, randomized studies must be performed to evaluate these potential therapeutical effects.

Table 4. Association Between Sitting Positions and Right-Sided Peripheral Artery Disease Anatomy

Sitting Position	Any right lesion			CIA			EIA			SFA		
	Lesion (–) n (%)	Lesion (+) n (%)	Statistics	Lesion (–) n (%)	Lesion (+) n (%)	Statistics	Lesion (–) n (%)	Lesion (+) n (%)		Lesion (–) n (%)	Lesion (+) n (%)	Statistics
Position #1 right												
Rarely	30 (93.8)	2 (6.2)	$\chi^2=62.601$ $P<.001$	31 (96.9)	1 (3.1)	$\chi^2=7.384$ $P=.025$	32 (100)	0 (0)	$\chi^2=9.287$ $P=.005$	31(96.9)	1 (3.1)	$\chi^2=32.658$ $P<.001$
Moderate frequency	25 (26.3)	70 (73.7)		71 (74.7)	24 (25.3)		85 (89.5)	10 (10.5)		53 (55.8)	42 (44.2)	
Frequently	0 (0)	23 (100)		18 (78.3)	5 (21.7)		17 (73.9)	6 (26.1)		5 (21.7)	18 (78.9)	
Position #2 right												
Rarely	3 (75)	1 (25)	$\chi^2=92.346$ $P<.001$	4 (100)	0 (0)	$\chi^2=14.479$ $P<.001$	3 (75)	1 (25)	$\chi^2=11.017$ $P=.002$	3 (75)	1 (25)	$\chi^2=38.025$ $P<.001$
Moderate frequency	48 (77.4)	14 (22.6)		58 (93.5)	4 (6.5)		61 (98.4)	1 (1.6)		54 (87.1)	8 (12.9)	
Frequently	4 (4.8)	80 (95.2)		58 (69)	26 (31)		70 (83.3)	14 (16.7)		32 (38.1)	52 (61.9)	
Position #3 right												
Rarely	6 (100)	0 (0)	$\chi^2=58.310$ $P<.001$	6 (100)	0 (0)	$\chi^2=10.533$ $P.=.004$	6 (100)	0 (0)	$\chi^2=8.235$ $P=.016$	6 (100)	0 (0)	$\chi^2=31.228$ $P<.001$
Moderate frequency	37 (69.8)	16 (30.2)		49 (92.5)	4 (7.5)		52 (98.1)	1 (1.9)		45 (84.9)	8 (15.1)	
Frequently	12 (13.2)	79 (86.8)		65 (71.4)	26 (28.6)		76 (83.5)	15 (16.5)		38 (41.8)	53 (58.2)	
Position #4 right												
Rarely	3 (100)	0 (0)	$\chi^2=88.077$ $P<.001$	3 (100)	0 (0)	$\chi^2=20.263$ $P<.001$	3 (100)	0 (0)	$\chi^2=6.03$ $P=.062$	3 (100)	0 (0)	$\chi^2=44.970$ $P<.001$
Moderate frequency	46 (78)	13 (22)		57 (96.6)	2 (3.4)		57 (96.6)	2		53 (89.9)	6 (10.1)	
Frequently	6 (6.8)	82 (93.2)		60 (68.2)	28 (31.8)		74 (84.1)	14		33 (37.5)	55 (62.5)	
Position #5 right												
Rarely	39 (44.3)	49 (55.7)	$\chi^2=5.766$ $P<.001$	77 (87.5)	11 (12.5)	$\chi^2=7.846$ $P=.018$	78 (88.6)	10	$\chi^2=0.198$ $P=1.000$	57 (64.8)	31 (35.2)	$\chi^2=5.592$ $P<.001$
Moderate frequency	16 (27.1)	43 (72.9)		41 (69.5)	18 (30.5)		53 (89.6)	6		32 (54.5)	27 (45.8)	
Frequently	0 (0)	3 (100)		2 (66.7)	1 (33.3)		3 (100)	0		0 (0)	3 (100)	
Position #6												
Rarely	39 (38.2)	63 (61.8)	$\chi^2=0.338$ $P=.561$	82 (80.4)	20 (19.6)	$\chi^2=0.031$ $P=.861$	89 (87.3)	13	$\chi^2=1.445$ $P=.229$	64 (62.7)	38 (37.3)	$\chi^2=1.538$ $P<.001$
Moderate frequency	16 (33.3)	32 (66.7)					45 (9.8)	3		25 (52.1)	23 (47.9)	
Frequently												

(*Continued*)

Table 4. Association Between Sitting Positions and Right-Sided Peripheral Artery Disease Anatomy (*Continued*)

	PA			ATA			PTA		
	Lesion (–)	Lesion (+)	Statistics	Lesion (–)	Lesion (+)	Statistics	Lesion (–)	Lesion (+)	Statistics
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
	32 (100)	0 (0)	$\chi^2=1.184$ $P=.619$	31 (96.9)	1 (3.1)	$\chi^2=0.985$ $P=.753$	31 (96.9)	1 (3.1)	$\chi^2=0.316$ $P=1.000$
	91 (95.8)	4 (4.2)		90 (94.7)	5 (5.3)		91 (95.8)	4 (4.2)	
	23 (100)	0 (0)		21 (91.3)	2 (8.7)		22 (95.7)	1 (4.3)	
	4 (100)	0 (0)	$\chi^2=1.158$ $P=.675$	4 (100)	0 (0)	$\chi^2=0.372$ $P=1.000$	4 (100)	0 (0)	$\chi^2=0.666$ $P=.745$
	61 (98.4)	1 (1.6)		59 (95.2)	3 (4.8)		59 (95.2)	3 (4.3)	
	81 (96.4)	3 (3.6)		79 (94)	5 (6)		81 (96.4)	3 (3.6)	
	6 (100)	0 (0)	$\chi^2=0.657$ $P=1.000$	6 (100)	0 (0)	$\chi^2=0.182$ $P=1.000$	6 (100)	0 (0)	$\chi^2=0.294$ $P=1.000$
	52 (98.1)	1 (1.9)		50 (94.3)	3 (5.7)		51 (96.2)	2 (3.8)	
	88 (96.7)	3 (3.3)		86 (94.5)	5 (5.5)		87 (95.6)	4 (4.4)	
	3 (100)	0 (0)	$\chi^2=1.266$ $P=.677$	3 (100)	0 (0)	$\chi^2=2.937$ $P=.275$	3 (100)	0 (0)	$\chi^2=0.977$ $P=.721$
	58 (98.3)	1 (1.7)		58 (98.3)	1 (1.7)		56 (94.9)	3 (5.1)	
	85 (96.6)	3 (3.4)		81 (92)	7 (8)		85 (96.6)	3 (3.4)	
	85 (96.6)	3 (3.4)	$\chi^2=1.266$ $P=.677$	85 (96.6)	3 (3.4)	$\chi^2=2.171$ $P=.379$	85 (96.6)	3 (3.4)	$\chi^2=0.977$ $P=.721$
	58 (98.3)	1 (1.7)		54 (91.5)	5 (8.5)		56 (94.9)	3 (5.1)	
	3 (100)	0 (0)		3 (100)	0 (0)		3 (100)	0 (0)	
	99 (97.1)	3 (2.9)	$\chi^2=0.093$ $P=1.000$	97 (95.1)	5 (4.9)	$\chi^2=0.117$ $P=.711$	100 (98)	2 (2)	$\chi^2=3.452$ $P=.083$
	47 (97.9)	1 (2.1)		45 (93.8)	3 (6.2)		44 (91.7)	4 (8.3)	

CIA, common iliac artery; EIA, external iliac artery; SFA, superficial femoral artery; PA, popliteal artery; ATA, anterior tibial artery; PTA, posterior tibial artery.

Table 5. Association Between Sitting Positions and Left-Sided Peripheral Artery Disease Anatomy

	Any Left Lesion			CIA			EIA			SFA		
Sitting Position	Lesion (−) n (%)	Lesion (+) n (%)	Statistics	Lesion (−) n (%)	Lesion (+) n (%)	Statistics	Lesion (−) n (%)	Lesion (+) n (%)	Statistics	Lesion (−) n (%)	Lesion (+) n (%)	Statistics
Position #1 left												
Rarely	16 (76.2)	5 (23.8)	$\chi^2=31.189$ $P<.001$	21 (100)	0 (0)	$\chi^2=5.719$ $P=.048$	20 (95.2)	1 (4.8)	$\chi^2=2.652$ $P=.289$	18 (85.7)	3 (14.3)	$\chi^2=25.141$ $P<.001$
Moderate frequency	33 (32.4)	69 (67.6)		84 (82.2)	18 (17.6)		93 (91.2)	9 (8.8)		57 (55.9)	45 (44.1)	
Frequently	0 (0)	27 (100)		21 (77.8)	6 (22.2)		22 (81.5)	5 (18.5)		4 (14.8)	23 (85.2)	
Position #2 left												
Rarely	4 (100)	0 (0)	$\chi^2=101.95$ $P<.001$	4 (100)	0 (0)	$\chi^2=5.475$ $P=.044$	4 (100)	0 (0)	$\chi^2=3.281$ $P=.159$	4 (100)	0 (0)	$\chi^2=60.049$ $P<.001$
Moderate frequency	44 (72.1)	17 (27.9)		56 (91.8)	5 (8.2)		58 (95.1)	3 (4.9)		53 (86.9)	8 (13.1)	
Frequently	1 (1.2)	84 (98.8)		66 (77.6)	19 (22.4)		73 (85.9)	12 (14.1)		22 (25.9)	63 (74.1)	
Position #3 left												
Rarely	6 (85.7)	1 (14.3)	$\chi^2=70.904$ $P<.001$	6 (85.7)	1 (14.3)	$\chi^2=4.022$ $P=.134$	7 (100)	0 (0)	$\chi^2=4.615$ $P=.099$	7 (100)	0 (0)	$\chi^2=55.785$ $P<.001$
Moderate frequency	36 (70.6)	15 (29.4)		47 (92.2)	4 (7.8)		49 (96.1)	2 (3.9)		45 (88.2)	6 (11.8)	
Frequently	7 (7.6)	85 (92.4)		73 (79.3)	19 (20.7)		79 (85.9)	13 (14.1)		27 (29.3)	65 (70.7)	
Position #4 left												
Rarely	3 (75)	1 (25)	$\chi^2=77.507$ $P<.001$	3 (75)	1 (25)	$\chi^2=10.992$ $P=.003$	4 (100)	0 (0)	$\chi^2=7.204$ $P=.021$	4 (100)	0 (0)	$\chi^2=50.032$ $P<.001$
Moderate frequency	40 (74.1)	14 (25.9)		52 (96.3)	2 (3.7)		53 (98.1)	1 (1.9)		47 (87)	7 (13)	
Frequently	6 (6.5)	86 (93.5)		71 (77.2)	21 (22.8)		78 (84.8)	14 (15.2)		28 (30.4)	64 (69.6)	
Position #5 left												
Rarely		62 (64.6)	$\chi^2=0.917$ $P=.338$	84 (87.5)	12 (12.5)	$\chi^2=2.431$ $P=.119$	86 (89.6)	10 (10.4)	$\chi^2=0.051$ $P=.821$	50 (52.1)	46 (47.9)	$\chi^2=0.036$ $P=.849$
Moderate frequency	34 (35.4)	39 (72.2)		42 (77.8)	12 (22.2)		49 (90.7)	5 (9.3)		29 (53.7)	25 (46.3)	
Frequently	15 (27.8)											
Position #6												
Rarely	37 (36.3)	65 (63.7)	$\chi^2=1.886$ $P=.170$	88 (86.3)	14 (13.7)	$\chi^2=1.227$ $P=.286$	91 (89.2)	11 (10.8)	$\chi^2=0.218$ $P=.775$	60 (58.8)	42 (41.2)	$\chi^2=4.847$ $P=.028$
Moderate frequency	12 (25)	36 (75)		38 (79.2)	10 (20.8)		44 (91.7)	4 (8.3)		19 (39.6)	29 (60.4)	
Frequently												

(*Continued*)

Table 5. Association Between Sitting Positions and Left-Sided Peripheral Artery Disease Anatomy (*Continued*)

PA			ATA			PTA		
Lesion (–)	Lesion (+)		Lesion (–)	Lesion (+)		Lesion (–)	Lesion (+)	
n (%)	n (%)	Statistics	n (%)	n (%)	Statistics	n (%)	n (%)	Statistics
20 (95.2)	1 (4.8)	$\chi^2=0.366$ $P=.874$	20 (95.2)	1 (4.8)	$\chi^2=0.188$ $P=1.000$	21 (100)	0 (0)	$\chi^2=2.215$ $P=.321$
96 (94.1)	6 (5.9)		94 (92.2)	8 (7.8)		96 (94.1)	6 (5.9)	
25 (92.6)	2 (7.4)		25 (92.6)	2 (7.4)		24 (88.9)	3 (11.1)	
4 (100)	0 (0)	$\chi^2=0.470$ $P=.794$	4 (100)	0 (0)	$\chi^2=1.075$ $P=.530$	4 (100)	0 (0)	$\chi^2=3.828$ $P=.137$
58 (95.1)	3 (4.9)		58 (95.1)	3 (4.9)		60 (98.4)	1 (1.6)	
79 (92.9)	6 (7.1)		77 (90.6)	8 (9.4)		77 (90.6)	8 (9.4)	
7 (100)	0 (0)	$\chi^2=0.126$ $P=1.000$	7 (100)	0 (0)	$\chi^2=0.390$ $P=.853$	7 (100)	0 (0)	$\chi^2=5.804$ $P=.059$
48 (94.1)	3 (5.9)		48 (94.1)	3 (5.9)		51 (100)	0 (0)	
86 (93.5)	6 (6.5)		84 (91.3)	8 (8.7)		83 (90.2)	9 (9.8)	
4 (100)	0 (0)	$\chi^2=0.274$ $P=1.000$	4 (100)	0 (0)	$\chi^2=1.781$ $P=.422$	4 (100)	0 (0)	$\chi^2=2.795$ $P=.342$
51 (94.4)	3 (5.6)		52 (96.3)	2 (3.7)		53 (98.1)	1 (1.9)	
86 (93.5)	6 (6.5)		83 (90.2)	9 (9.8)		84 (91.3)	8 (8.7)	
89 (92.7)	7 (7.3)	$\chi^2=0.789$ $P=0.490$	92 (95.8)	4 (4.2)	$\chi^2=3.935$ $P=.057$	92 (95.8)	4 (4.2)	$\chi^2=1.589$ $P=.284$
52 (96.3)	2 (3.7)		47 (87)	7 (13)		49 (90.7)	5 (9.3)	
97 (95.1)	5 (4.9)	$\chi^2=0.681$ $P=.468$	95 (93.1)	7 (6.9)	$\chi^2=0.104$ $P=.745$	96 (94.1)	6 (5.9)	$\chi^2=0.008$ $P=1.000$
44 (91.7)	4 (98.3)		44 (91.7)	4 (8.3)		45 (93.8)	3 (6.2)	

CIA, common iliac artery; EIA, external iliac artery; SFA, superficial femoral artery; PA, popliteal artery; ATA, anterior tibial artery; PTA, posterior tibial artery.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Ankara University, (Approval No: 333134).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

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Author Contributions: MA and EB designed the study and collected data. KE and DK analyzed data (including angiographic images). All authors contributed equally for writing and editing of the manuscript.

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Table S1. Characteristics of sitting position and symptom incidence

	Rigth		Left	
	n	%	n	%
Sitting position #1				
Never	0	0	0	0
Rarely	32	21.3	21	14
Medium frequency	95	63.3	102	68
Frequently	23	15.3	27	18
Duration				
5-15 minutes	46	30.7	48	32
15-30 minutes	104	69.3	102	68
30-60 minutes	0	0	0	0
Pain	91	60.7	93	62
Tingling	150	100	150	100
Sitting position #2				
Never	0	0	0	0
Rarely	4	2.7	4	2.7
Medium frequency	62	41.3	61	40.7
Frequently	84	56	85	56.7
Duration				
5-15 minutes	80	53.3	90	60
15-30 minutes	70	46.7	59	39.3
30-60 minutes	0	0	1	0.7
Pain	93	62	99	66
Tingling	150	100	150	100
Sitting position #3				
Never	0	0	0	0
Rarely	6	4	7	4.7
Medium frequency	53	35.3	51	34
Frequently	91	60.7	92	61.3
Duration				
5-15 minutes	88	58.7	88	58.7
15-30 minutes	61	40.7	61	40.7
30-60 minutes	1	0.7	1	0.7
Pain	97	64.7	104	69.3
Tingling	149	99.3	150	100
Sitting position #4				
Never	0	0	0	0
Rarely	3	2	4	2.7
Medium frequency	59	39.3	54	36
Frequently	88	58.7	92	61.3
Duration				
5-15 minutes	82	54.7	89	59.3
15-30 minutes	68	45.3	60	40
30-60 minutes	0	0	1	0.7
Pain	57	38	59	39.3
Tingling	149	99.3	150	100
Sitting position #5				
Never	0	0	0	0
Rarely	88	58.7	96	64
Medium frequency	59	39.3	53	35.3
Frequently	3	2	1	0.7

(*Continued*)

Table S1. Characteristics of sitting position and symptom incidence (*Continued*)

	Rigth		Left	
	n	**%**	**n**	**%**
Duration				
5-15 minutes	10	6.7	7	4.7
15-30 minutes	135	90	139	92.7
30-60 minutes	5	3.3	4	2.7
Pain	57	38	59	39.3
Tingling	149	99.3	150	100
Sitting position #6	**n**		**%**	
Never	0		0	
Rarely	102		68	
Medium frequency	48		32	
Frequently	0		0	
Duration				
5-15 minutes	8		5.3	
15-30 minutes	134		89.3	
30-60 minutes	8		5.3	
Pain	52		34.7	
Tingling	150		100	