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Examination of the Anorectal Angle and Pubococcygeal Line in Adults with Anal Disorders and Defecation Irregularities Using Magnetic Resonance Imaging

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ABSTRACT

Objective: This study explores the role of pelvic floor (PF) muscles in individuals with anal area diseases and defecation irregularities.

Materials and Methods: Anorectal angle (ARA), pubococcygeal line (PCL), and the distance between ARA and PCL were measured retrospectively in 392 images from patients over 18 years old who underwent lower abdomen magnetic resonance (MR) defecography (sagittal, T2 sequence). The patients presented with complaints of fecal incontinence, chronic constipation, anal fissures, hemorrhoids, anal abscesses, and anal or perianal fistulas. Measurements were taken during three phases: rest, Valsalva maneuver, and the final phase of defecation. Patients were categorized according to the World Health Organization's age classification, and average ages for childbirth and menopause were determined using data from the Turkish Statistical Institute.

Results: Across all patients, the ARA did not sufficiently constrict during Valsalva, and was wider in women during all defecation phases. The ARA was wider at rest in patients aged 65 and over, and during the final defecation phase in the 45–64 age group compared to other age groups. Throughout all phases of defecation, the PCL was longer in women and in the 45–64 age group than in others; PF descent during Valsalva and the final phase was greater in these groups as well.

Conclusion: The findings highlight that PF insufficiency is more pronounced in the postmenopausal period. Evaluation of the PF should be integrated into the diagnostic and treatment protocols for anal area diseases, with an emphasis on PF rehabilitation.

Keywords: Constipation, fecal incontinence, anal disorders, pelvic floor, anal canal, rectum.

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INTRODUCTION

The levator ani, the primary muscle of the pelvic floor (PF), consists of three muscle groups: the pubococcygeus, iliococcygeus, and ischiococcygeus. The rectum narrows at its lower end, passes through the PF, and becomes the anal canal. The anorectal angle (ARA) is located at the junction between the anal canal and the rectum. The puborectalis, consisting of the medial fibers of the pubococcygeus, forms a U-shape and constricts by wrapping around the upper part of the rectal neck. This action pulls the anus forward, resisting or halting the defecation process.[1]

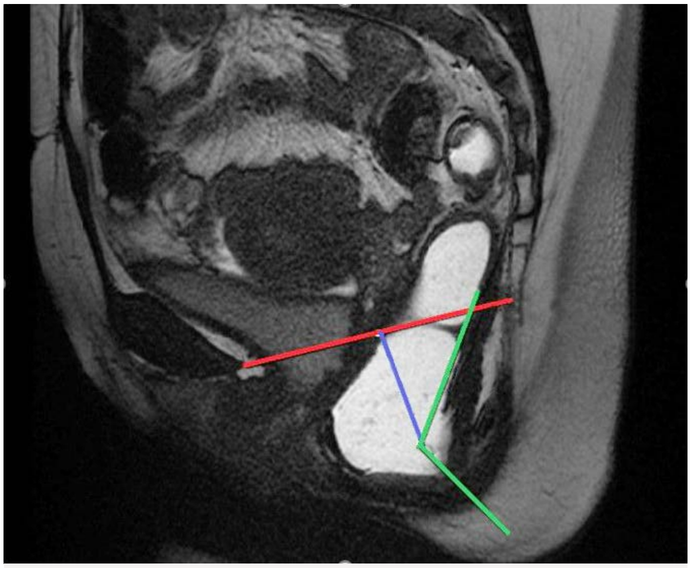

Figure 1. Measurements of the Anorectal Angle (ARA) (green line), Pubococcygeal Line (PCL) (red line), and the distance between ARA and PCL (blue line) during the Valsalva phase of defecation in a female patient with constipation.

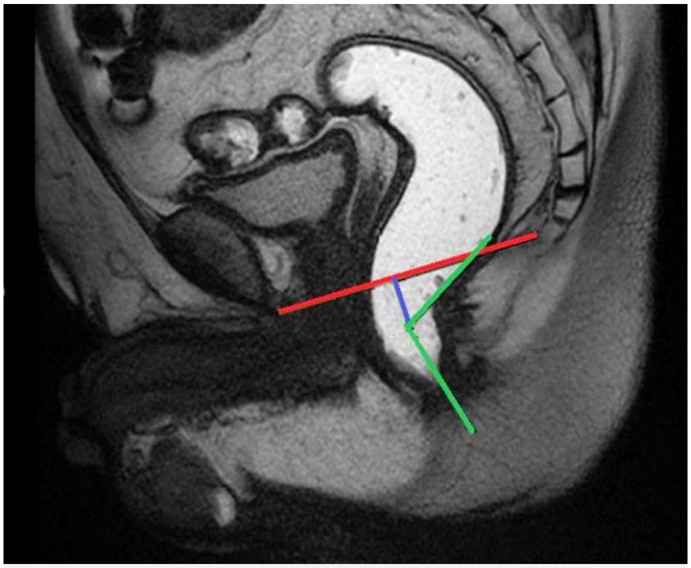

Figure 2. Measurements of the ARA (green line), PCL (red line), and the distance between ARA and PCL (blue line) during the Valsalva phase of defecation in a male patient with constipation.

At rest, the ARA is approximately 90 degrees. During the Valsalva maneuver, the anorectal junction moves upwards and forwards, decreasing the angle. In contrast, during defecation, the puborectalis muscle relaxes, allowing the anorectal junction to move slightly downwards and the angle to increase. The change in the ARA between the Valsalva and defecation phases in healthy individuals should not exceed 20 degrees.[2,3] The pubococcygeal line (PCL) is calculated by drawing a line from the lower border of the pubic symphysis to the last coccygeal joint, indicating the level of PF.[4] With sagittal magnetic resonance imaging (MRI) during defecography, it is possible to observe pelvic organ descent by measuring the ARA, the PCL, and the distance between them.[5] In healthy individuals, during defecation, the ARA should not descend more than 2 cm below the PCL.[3] Fecal incontinence is defined as the involuntary passage of feces through the anal canal and can be caused by damage to the puborectalis muscle or one of the anal sphincter muscles.[6] Constipation is characterized by a decrease in the frequency of bowel movements.[7] Diseases of the anal area include anal fissures, hemorrhoids, anal abscesses, and anal or perianal fistulas. An anal fissure is a small tear in the anoderm. Infections originating in the anal glands can lead to anal abscess or fistula. Hemorrhoids are swellings formed by the dilation of venous vessels. In conditions affecting the anal area, sphincter tone increases and pain is common.[8] The aim of this study is to evaluate the ARA, PCL, and the distance between them in different phases of defecation using MRI.

MATERIALS AND METHODS

Ethical approval for this cross-sectional study was granted by the Tokat Gaziosmanpasa University Ethics Committee (approval No. 23-KAEK-097) on April 13, 2023. The study aimed to investigate the role of PF muscles in individuals with anal area diseases and defecation irregularities. We used G*Power 3.1.9.7 to determine the sample size. The effect size was calculated at 0.41 based on the difference between the means of two independent groups, with a margin of error (α) set at 0.05 and power (1-β) at 0.95. Consequently, the required sample size was established as 392 participants.[9] We retrospectively examined images from 392 patients (31.9% male, 68.1% female; age range 18–89 years) who presented at Tokat Gaziosmanpasa University Hospital between March 21, 2017, and November 13, 2023. These patients, suffering from conditions such as fecal incontinence, chronic constipation, anal fissure, hemorrhoids, anal abscess, and anal and perianal fistula, had undergone lower abdominal dynamic MRI. Exclusion criteria included poor image quality, previous anorectal surgery, and lower abdominal pathologies such as tumors. Notably, 70% of patients with hemorrhoids and all those with diagnosed perianal and anal abscesses had a history of constipation. Patients diagnosed with anal fissures and fistulas exhibited no accompanying defecation irregularities. Data were collected by taking the average of three measurements by a radiologist with five years of experience. MRI examinations were performed using a 1.5 Tesla General Electric Signa Explorer (GE Healthcare, U.S.). The

Table 1. Distribution of patients by age, diagnosis, and gender

Parameters	Female		Male		Total	
	n	%	n	%	n	%
Age						
18–29	29	10.9	8	6.4	37	9.4
30–44	67	25.1	16	12.8	83	21.2
45–64	108	40.4	45	36.0	153	39.0
≥65	63	23.6	56	44.8	119	30.4
Diagnosis						
Incontinence	23	8.6	8	6.4	31	7.9
Constipation	222	83.1	106	84.8	328	83.7
Anal abscess	0	0.0	1	0.8	1	0.3
Anal fissure	5	1.9	1	0.8	6	1.5
Anal fistula	2	0.7	1	0.8	3	0.8
Perianal abscess	1	0.4	0	0.0	1	0.3
Hemorrhoids	14	5.2	8	6.4	22	5.6

MR defecography parameters included a T2-weighted sagittal time to repeat (TR) of 3189 ms, time to echo (TE) of 151 ms, field of view (FOV) of 260 mm, slice thickness of 6 mm, and flip angle of 45°. Measurements of the PCL and ARA were based on methodologies from similar studies in the literature.[5,9–11] Measurements were conducted using Sectra Workstation IDS7 software. The ARA was calculated by measuring the angle between the midline of the anal canal and the line tangent to the posterior wall of the rectum. The PCL was determined by drawing a line from the lower border of the pubic symphysis to the last coccygeal joint. Subsequently, the distance between the PCL and the anorectal junction was measured (Fig. 1, 2).

Statistical Analysis

Data were analyzed using SPSS (Statistical Package for Social Sciences for Windows, version 22.0). Given that the sample size exceeded 30 participants, the appropriateness of the data for normal distribution was assessed using the Kolmogorov-Smirnov test. Parametric tests, including the independent samples t-test and Analysis of Variance (ANOVA), were applied to compare groups when the significance level was above 0.05 and the data followed a normal distribution. The Mann-Whitney U Test and the Kruskal-Wallis Test were utilized for comparing groups when the significance level was below 0.05 and the data did not conform to normal distribution. If the Kruskal-Wallis Test result was significant, the Mann-Whitney U Test—adjusted by the Bonferroni Correction—was employed to identify differences between specific groups. Similarly, if the ANOVA result was significant, the Tukey test, a post-hoc test, was used to determine intergroup differences. In this study, the threshold for significance was set at $p<0.05$, and the analysis was interpreted based on whether the results were above or below this value.

RESULTS

Patients were stratified into groups based on age, either above or below 65 years, in accordance with the age classification by the World Health Organization (WHO). According to data from the Turkish Statistical Institute (TUIK), the average age at childbirth in Türkiye is 29.2 years, and the average age at menopause is 45 years. Based on this data, patients under 65 were further categorized into three age groups. The distribution of patients by age, diagnosis, and gender is presented in Table 1.

No significant differences were observed in PCL values during the resting phase across different age groups ($p=0.121$). However, during the Valsalva maneuver, mean PCL values were higher in the 45–64 age group compared to the 18–29 age group ($p=0.005$). Additionally, in the final phase of defecation, PCL values in the 45–64 age group were higher than those in the 18–29 and 30–44 age groups ($p=0.006$) (Table 2).

ARA in the evaluated patients revealed no significant differences by age during the Valsalva maneuver in the resting phase ($p=0.124$). However, the ARA for patients aged 65 years and older was higher than that for the 18–29 age group ($p=0.007$). During the final phase of defecation, ARA values were higher in the 45–64 age group compared to other age groups ($p=0.023$) (Table 2).

Table 2. Analysis of the pubococcygeal line, anorectal angle, and pubococcygeal line-anorectal angle distance by age

Parameter (unit)	Age (years)	Number (n)	Mean±SD Median (Min–Max)	F/X²	p	Post-hoc/ Bonferroni
Resting PCL (mm)	18–29	37	87.83±12.83	1.95	0.121	
	30–44	83	90.4±10.71			
	45–64	153	92.28±11.19			
	≥65	119	90.23±10.52			
Valsalva PCL (mm)	18–29	37	83.60 (69.60–115.50)	12.87*	0.005	45–64>18–29
	30–44	83	91.40 (66.90–118.50)			
	45–64	153	94.60 (70.30–126.70)			
	≥65	119	92.40 (64.40–119.70)			
Defecation PCL (mm)	18–29	37	88.10 (74.60–117.20)	12.34*	0.006	45–64>18–29 45–64>30–44
	30–44	83	92.20 (64.50–118.90)			
	45–64	153	96.60 (67.10–132.10)			
	≥65	119	95.00 (62.10–114.70)			
Resting ARA (°)	18–29	37	89.39±10.32	12.27	0.007	(≥65)>18–29
	30–44	83	91.98±13.35			
	45–64	153	94.77±13.24			
	≥65	119	96.8±13.56			
Valsalva ARA (°)	18–29	37	92.42±13.52	1.93	0.124	
	30–44	83	92.73±15.97			
	45–64	153	97.45±15.39			
	≥65	119	94.29±19.97			
Defecation ARA (°)	18–29	37	99.44±19.33	323	0.023	45–64>18–29 45–64>30–44 45–64>(≥65)
	30–44	83	100.61±18.78			
	45–64	153	107.28±19.1			
	≥65	119	101.67±22.11			
Resting PCL-ARA (mm)	18–29	37	6.40 (0.00–28.30)	0.22*	0.974	
	30–44	83	6.20 (0.00–24.70)			
	45–64	153	7.10 (0.00–25.60)			
	≥65	119	7.20 (0.00–32.80)			
Valsalva PCL-ARA (mm)	18–29	37	7.30 (0.00–45.10)	18.37*	0.000	45–64>18–29 45–64>30–44 45–64>(≥65)
	30–44	83	11.20 (0.00–48.90)			
	45–64	153	15.90 (0.00–58.10)			
	≥65	119	12.00 (0.00–56.20)			
Defecation PCL-ARA (mm)	18–29	37	12.20 (0.00–55.10)	23.12*	0.000	45–64>18–29 45–64>(≥65)
	30–44	83	20.80 (0.00–66.90)			
	45–64	153	30.50 (0.00–77.80)			
	≥65	119	18.10 (0.00–60.20)			

Values are presented as mean±SD and median (minimum–maximum). ARA: Anorectal angle; PCL: Pubococcygeal line; PCL-ARA: Pubococcygeal line-anorectal angle distance; SD: Standard deviation; *: Kruskal-Wallis Test.

Table 3. Analysis of the pubococcygeal line, anorectal angle, and pubococcygeal line-anorectal angle distance by gender

Measurement	Gender	Number (n)	Mean±SD Median (Min–Max)	t/Z	p
Resting PCL (mm)	Female	267	92.49±11.1	4.41	0.000
	Male	125	87.32±10.27		
Valsalva PCL (mm)	Female	267	94±10.95	3.61	0.000
	Male	125	89.78±10.45		
Defecation PCL (mm)	Female	267	95.58±10.81	3.83	0.000
	Male	125	91.17±10.18		
Resting ARA (°)	Female	267	93.90 (61.50–129.60)	-1.45*	0.145
	Male	125	91.10 (62.60–146.40)		
Valsalva ARA (°)	Female	267	97.01±16.42	3.45	0.001
	Male	125	90.76±17.31		
Defecation ARA (°)	Female	267	106.40 (60.00–152.50)	-4.42*	0.000
	Male	125	93.00 (52.70–157.00)		
Resting PCL-ARA (mm)	Female	267	6.90 (0.00–32.80)	-0.27*	0.786
	Male	125	7.60 (0.00–26.10)		
Valsalva PCL-ARA (mm)	Female	267	13.80 (0.00–58.10)	-2.72*	0.007
	Male	125	9.60 (0.00–48.90)		
Defecation PCL-ARA (mm)	Female	267	27.40 (0.00–77.80)	-6.1*	0.000
	Male	125	12.10 (0.00–65.70)		

Values are presented as mean±SD and median (minimum–maximum). ARA: Anorectal angle; PCL: Pubococcygeal line; PCL-ARA: Pubococcygeal line-anorectal angle distance; SD: Standard deviation; *: Mann-Whitney U Test.

When assessing PCL-ARA distance values in terms of age, no significant differences were found during the resting phase (p=0.974). Mean PCL-ARA distance values were higher in the 45–64 age group during the Valsalva maneuver compared to other groups (p<0.001). In the final defecation phase, these values were also higher in the 45–64 age group compared to both the 18–29 age group and those over 65 (p<0.001) (Table 2).

PCL values were higher in female patients than in male patients across all three phases of defecation (p<0.001) (Table 3).

In terms of gender, while no significant differences were found in ARA values during the resting phase (p=0.145), ARA measurements in both the Valsalva and final phases were higher in female patients (p<0.001) (Table 3).

No significant differences were observed in the mean PCL-ARA values during the resting phase across genders (p=0.786). However, mean PCL-ARA values during the Valsalva and final defecation phases were higher in female patients (p=0.007 and p<0.001, respectively) (Table 3).

When examining ARA, PCL, and PCL-ARA values across diagnostic variables, no significant differences were detected in all three stages of defecation (p>0.05).

In female patients, analysis of ARA, PCL, and ARA-PCL values across different age groups revealed that average PCL and PCL-ARA values during the Valsalva and final defecation phases were higher in the 45–64 age group compared to the 18–29 and 30–44 age groups (p<0.001). Resting ARA averages for female patients in the 45–64 age group were higher compared to those in the 18–29 age group and were also elevated in those over 65 compared to the 18–29 and 30–44 age groups (p=0.001) (Table 4).

When examining ARA, PCL, and PCL-ARA values in male patients, no significant differences were detected according to age in all three phases of defecation (p>0.05) (Table 5).

DISCUSSION

In the early stages of anal area diseases, patient apprehension or fear can result in a reluctance to seek treatment. This delay can lead to progression into PF dysfunction. Literature reviews reveal that PF, especially the puborectalis muscle, has been frequently overlooked in the treatment of anal area diseases, fecal incontinence, and chronic constipation.[9–14]

Table 4. Analysis of the pubococcygeal line, anorectal angle, and pubococcygeal line-anorectal angle distance in female patients by age

Parameter (unit)	Age (years)	Number (n)	Mean±SD Median (Min–Max)	F/X²	p	Post-hoc/ Bonferroni
Resting PCL (mm)	18–29	29	89.74±12.09	2.09	0.102	
	30–44	67	90.88±10.40			
	45–64	108	94.34±11.08			
	≥65	63	92.32±11.11			
Valsalva PCL (mm)	18–29	29	85.70 (71.90–109.90)	14.13*	0.003	45–64>18–29 45–64>30–44
	30–44	67	91.40 (66.90–118.50)			
	45–64	108	96.45 (71.90–126.70)			
	≥65	63	95.80 (64.40–119.70)			
Defecation PCL (mm)	18–29	29	89.70 (74.60–109.50)	17.99*	0.000	45–64>18–29 45–64>30–44
	30–44	67	92.80 (64.50–118.90)			
	45–64	108	99.05 (72.60–132.10)			
	≥65	63	97.60 (62.10–114.70)			
Resting ARA (°)	18–29	29	89.37±8.76	6.07	0.001	45–64>18–29 ≥65>18–29 ≥65>30–44
	30–44	67	91.33±12.66			
	45–64	108	95.83±12.04			
	≥65	63	98.32±11.72			
Valsalva ARA (°)	18–29	29	93.28±11.82	2.09	0.102	
	30–44	67	93.85±15.27			
	45–64	108	98.98±14.37			
	≥65	63	98.68±21.50			
Defecation ARA (°)	18–29	29	100.55±18.87	3.47	0.017	45–64>18–29 45–64>30–44 ≥65>18–29 ≥65>30–44
	30–44	67	102.05±17.74			
	45–64	108	109.05±17.33			
	≥65	63	109.38±21.03			
Resting PCL-ARA (mm)	18–29	29	6.40 (0.00–28.30)	0.61*	0.894	
	30–44	67	6.00 (0.00–24.70)			
	45–64	108	7.00 (0.00–25.60)			
	≥65	63	6.90 (0.00–32.80)			
Valsalva PCL-ARA (mm)	18–29	29	6.30 (0.00–20.60)	26.31*	0.000	45–64>18–29 45–64>30–44
	30–44	67	12.00 (0.00–43.30)			
	45–64	108	19.25 (0.00–58.10)			
	≥65	63	13.30 (0.00–56.20)			
Defecation PCL-ARA (mm)	18–29	29	12.10 (0.00–48.70)	23.85*	0.000	45–64>18–29 45–64>30–44
	30–44	67	23.40 (1.70–66.90)			
	45–64	108	35.30 (0.00–77.80)			
	≥65	63	25.70 (0.00–60.20)			

Values are presented as mean±SD and median (minimum–maximum). ARA: Anorectal angle; PCL: Pubococcygeal Line; PCL-ARA: Pubococcygeal line-anorectal angle distance; SD: Standard Deviation. *: Kruskal-Wallis Test.

Table 5. Analysis of the pubococcygeal line, anorectal angle, and pubococcygeal line-anorectal angle distance in male patients by age

Parameter (unit)	Age (years)	Number (n)	Mean±SD Median (Min–Max)	F/X^2	p
Resting PCL (mm)	18–29	8	80.90±13.87	1.16	0.327
	30–44	16	88.41±12.08		
	45–64	45	87.36±9.95		
	≥65	56	87.89±9.37		
Valsalva PCL (mm)	18–29	8	79.40 (69.60–115.50)	5.22	0.156
	30–44	16	90.55 (67.80–114.50)		
	45–64	45	89.50 (70.30–111.00)		
	≥65	56	90.40 (71.70–118.30)		
Defecation PCL (mm)	18–29	8	82.75 (78.10–117.20)	0.80	0.851
	30–44	16	90.50 (64.80–114.70)		
	45–64	45	91.60 (67.10–111.90)		
	≥65	56	92.10 (72.60–113.90)		
Resting ARA (°)	18–29	8	89.48±15.50	0.50	0.682
	30–44	16	94.69±16.12		
	45–64	45	92.24±15.61		
	≥65	56	95.09±15.30		
Valsalva ARA (°)	18–29	8	89.31±19.15	0.72	0.540
	30–44	16	88.02±18.39		
	45–64	45	93.76±17.21		
	≥65	56	89.34±16.96		
Defecation ARA (°)	18–29	8	95.41±21.78	1.93	0.128
	30–44	16	94.59±22.29		
	45–64	45	103.01±22.44		
	≥65	56	92.98±20.13		
Resting PCL-ARA (mm)	18–29	8	6.45 (0.00–17.10)	1.08	0.782
	30–44	16	7.00 (0.00–21.00)		
	45–64	45	7.60 (0.00–22.10)		
	≥65	56	7.85 (0.00–26.10)		
Valsalva PCL-ARA (mm)	18–29	8	10.45 (0.00–45.10)	0.25	0.968
	30–44	16	10.15 (0.00–48.90)		
	45–64	45	9.70 (0.00–44.70)		
	≥65	56	9.20 (0.00–40.30)		
Defecation PCL-ARA (mm)	18–29	8	18.45 (4.10–55.10)	4.37	0.224
	30–44	16	12.45 (0.00–65.70)		
	45–64	45	15.40 (0.00–64.90)		
	≥65	56	10.90 (0.00–51.80)		

Values are presented as mean±SD and median (minimum–maximum). ARA: Anorectal angle; PCL: Pubococcygeal line; PCL-ARA: Pubococcygeal line-anorectal angle distance; SD: Standard deviation.

On MR images, the PCL indicates the level of the PF.[11] Zhang et al.[13] investigated PCL in patients with pelvic organ prolapse during preoperative and postoperative periods. They reported that patients with prolapse exhibited longer PCL lengths compared to the control group, with a notable decrease observed postoperatively. In our study, PCL length was found to be higher in women across all phases of defecation, which we attribute to anatomical differences between the male and female pelvis.[15] Additionally, PCL lengths were found to be longer in the 45–64 age group compared to other age groups. We believe this difference may be associated with changes in PF function during menopause.[16]

The reliability of our ARA measurement method is corroborated by several studies.[9,17,18] It is documented that ARA widens with weakening of the puborectalis in cases of fecal incontinence, and the severity of incontinence escalates as the angle increases. Notably, an ARA greater than 130 degrees suggests incontinence due solely to puborectalis dysfunction. Lower anal canal resting pressures have been observed in incontinent patients compared to healthy individuals, with increased ARA expansion during defecation phases, attributed to diminished activity of PF muscles and pudendal nerve damage.[19–21] Furthermore, it has been reported that in patients diagnosed with incontinence, ARA does not narrow sufficiently during the Valsalva maneuver and expands more than normal during defecation.[22,23]

Pucciani et al.[2] reported an inability of the puborectalis to relax in individuals with functional defecation disorders.

Mugie et al.[18] examined the ARA and PF mobility in children with defecation disorders using fluoroscopic defecography. They observed PF dyssynergia and dysfunction in 78% of the patients. They reported that for the non-patient group, the ARA ranged from 80–120 degrees during the resting phase and increased by 20–45 degrees during defecation.

Andrade et al.[17] analyzed conventional video defecography images of elderly and young patients diagnosed with dyskinetic puborectalis syndrome. They noted that the ARA remained unchanged across different phases of defecation.

Tirumanisetty et al.[9] investigated the effects of age, parity, and body mass index (BMI) on PF muscles, noting that the resting ARA was lower than the average resting value in young obese women, yet higher in older obese women. They found no correlation between changes in ARA during the defecation phase and age, BMI, or parity.

In our study, the absence of ARA constriction in the Valsalva phase suggests dysfunction of the puborectalis muscle in conditions like chronic constipation, fecal incontinence, and anal area diseases. We observed that the ARA was wider during the resting phase of defecation in patients aged 65 years and older and during the final phase in those aged 45–64 compared to other age groups, in contrast to findings by Andrade et al.[17] We believe that the observed phenomenon may be attributed to PF insufficiency in postmenopausal female patients.[16] It is possible to widen the ARA by relaxing the puborectalis muscle. In elderly patients, an increase in ARA during the resting phase suggests a decrease in muscle tone with advancing age.

In our study, the ARA was found to be wider in female patients during both the Valsalva maneuver and the final phase of defecation. No other studies examining the relationship between gender and ARA have been identified in the literature. Tirumanisetty et al.[9] reported that changes in ARA during the last phase of defecation were not correlated with parity. Our findings indicate that the PF is weaker in women. The discrepancy in findings may be due to the studies being conducted in different populations. However, a limitation of our study is that we did not evaluate parity. Another shortcoming of our study is that we did not evaluate BMI.

Our data indicate that a PF descent greater than 2 cm during the defecation phase signifies a loss of strength in the PF muscles.

Andrade et al.[17] noted that the PF was positioned lower at rest in women and elderly individuals. In our research, PF descent during the Valsalva maneuver and the final defecation phase was more pronounced in women and in those aged 45–64, suggesting that menopause adversely affects PF muscles.

Our study also demonstrated that the ARA does not constrict sufficiently during the Valsalva maneuver in cases of anal area diseases, indicating that the PF is more mobile than typical values reported in the literature.

Studies have reported that balloon and biofeedback therapies for the PF have yielded positive results in treating defecation disorders.[24,25]

In our study, we analyzed measurement results for the ARA, PCL, and PCL-ARA at different phases of defecation in patients diagnosed with anal region diseases, fecal incontinence, and chronic constipation. Our study highlights the impact of these diseases on PF function, as well as the influence of gender and age.

CONCLUSION

The pronounced severity of PF insufficiency in the elderly, particularly in postmenopausal women, underscores the importance of PF rehabilitation for aging individuals. We believe that PF assessment using MR defecography and inclusion of PF rehabilitation in the treatment programs for chronic constipation, fecal incontinence, and anal region diseases are essential.

Ethics Committee Approval: The Tokat Gaziosmanpasa University Clinical Research Ethics Committee granted approval for this study (date: 13.04.2023, number: 23-KAEK-097).

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