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## INTRODUCTION AND AIM

Metabolic bone disorders due to calcium and vitamin D deficiency are one of the most frequent extraintestinal symptoms in Celiac disease.

In this study it is aimed to evaluate bone mineral density in patients with Celiac disease during diagnose and evaluate the factors related to bone mineral metabolism.

## MATERIAL AND METHOD

The study included 43 children (34 girl) diagnosed as Celiac disease. Mean age was 9.9±4.8 (2.5-17.7) years.



Clinical  
Anthropometric  
Patological

Calcium (Ca)  
Phosphor (P)  
Alkalenphosphataz (ALP)  
Parathormon (PTH)  
25OH vitamin D levels

Lumbal (L1-L4) bone mineral density (BMD) levels measured via DEXA (Dual Energy X-Ray Absorptiometry) were evaluated

Z scores due to chronological age (Z-CA)  
Z scores due to height age (Z-HA)



## RESULTS

Table 1: Clinical features of the cases

	Mean±SD	min-max
Age (year)	9.9±4.8	2.5-17.7
Weight (Kg)	29.9±14.6	11.4-65.5
Weight SD	-1.1±1.1	-3.5-0.8
Height (cm)	130.0±27.0	86.5-178.3
Height SD	-0.9±1.3	-4.2-1.9
BMI (kg/m <sup>2</sup> )	16.4±2.1	12.9-22.4
BMI SD	-0.8±1.1	-3.1-1.0
Stage of puberty (median)	1	1-5

0-6 years 30.2% (n=13)  
7-11 years 30.2% (n=13)  
>11 years 39.5% (n=17)  
46.5% (n=20) pubertal

Table 2: Laboratory features of cases

	Mean±SD	min-max
Ca (mg/dl)	9.7±0.4	8.9-10.9
P (mg/dl)	4.7±0.6	2.7-6.0
ALP (U/L)	203.0±100.1	100.0-466.0
PTH (pg/ml)	45.0±21.5	19.6-109.3
25 OH vit D (ng/ml)	13.5±7.7	4.6-35.1
BMD (gr/cm <sup>2</sup> )	0.6±0.2	0.3-1.0
Z-CA	-0.8±1.1	-3.6-1.6
Z-HA	-0.2±1.1	-3.6-1.9

Celiac type  
Typical 16.7% (n=7)  
Atypical 64.3% (n=28)  
Silent 19% (n=8)

Marsh stage  
Type-1 9.3% (n=4)  
Type-2 4.7% (n=2)  
Type-3a 32.5% (n=14)  
Type-3b 25.6% (n=11)  
Type-3c 27.9% (n=12)

There were no difference in BMD Z scores due to chronological and height ages (p=0.150, p=0.225, respectively).

There was positive correlation between BMD Z scores due to chronological age and body weight, height and BMI Z scores (p<0.001, p=0.005, p=0.015, respectively).

No relation between BMD Z scores and plasma vitamin D, Ca, P, ALP and PTH levels (p>0.050).

No relation between BMD Z scores and Celiac type and Marsh histopathologic stage (p>0.050)

Age group	BMD Z scores due to chronological age		
	<-2	-1 to -2	>-1
0-6 years	0% (n=0)	53.8% (n=7)	46.2% (n=6)
7-11 years	0% (n=0)	46.2% (n=6)	53.8% (n=7)
>11 years	35.3% (n=6)	11.8% (n=2)	52.9% (n=9)
Total	14% (n=6)	34.9% (n=15)	51.2% (n=22)

## DISCUSSION

Rickets, osteopenia, osteoporosis and bone deformities may develop due to impaired calcium and vitamin D absorption in Celiac patients. In the literature, it is suggested to perform BMD measurement in case of newly diagnosed celiac disease.

It has been suggested that at the time of diagnosis the Marsh histopathologic stage can predict the formation of low BMD with a risk of developing osteoporosis. On the other hand, there are also studies suggesting that BMD of Celiac patients have no association with Marsh histopathologic stage at the time of diagnosis and that there are no clinical and laboratory markers for low BMD in children with Celiac disease.

An important point about Celiac disease-related osteoporosis is that full improvement in BMD are possible in children by gluten-free diet therapy, which is not true for adults. This requires early diagnosis and treatment of patients.

It has been reported in the literature that in children with Celiac disease, the BMD Z-scores decrease while age increases and that bone mineral loss increases proportionally with age.

## CONCLUSION

Diagnose in higher ages effects bone mineral density negatively in Celiac disease. Diagnose in early ages decreases bone mineral leak and decreases morbidity in patients with osteopeni and osteoporosis via treatment possibilities.

