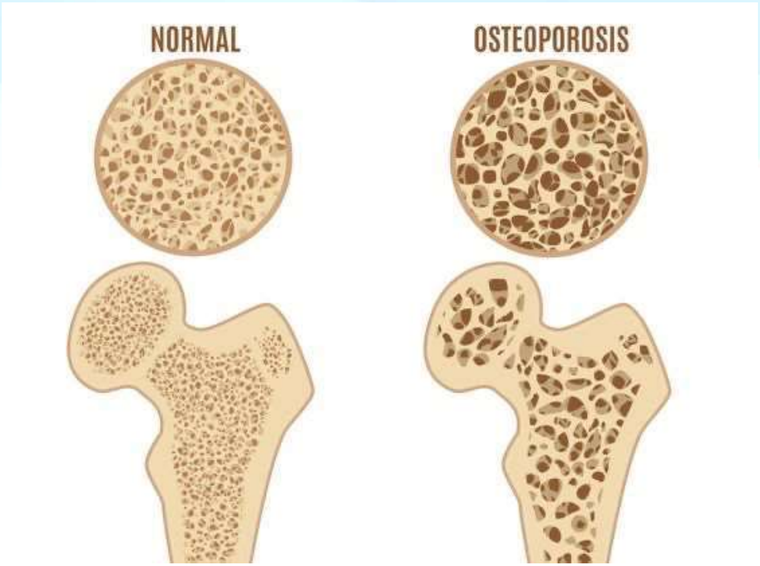
HIV ile Yaşayan Bireylerde Osteopeni ve Osteoporoz Yaygınlığı: Dünyada ve Türkiye'deki Durum ve Olgu Sunumu

Sabri Atalay
İzmir Tepecik Eğitim ve Araştırma Hastanesi
Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Kliniği

KLİMİK HIV/AIDS Çalışma Grubu HIV/AIDS ve Komorbiditeler Ege Bölgesi Simpozyumu
13-14 Ekim 2023 - İzmir

Giriş

- Günümüzde HIV’li kişilerin yaşam beklentisi HIV negatif kişilere yakın
- Yaşlanma ile ilişkili komorbiditeler ve osteoporoz daha sık
- Kırık riski genel popülasyona göre 10 yıl daha erken başlamakta



Biver E. (2022). Osteoporosis and HIV Infection. *Calcified tissue international*, *110*(5), 624–640. https://doi.org/10.1007/s00223-022-00946-4

Giriş- Osteoporoz nedenleri

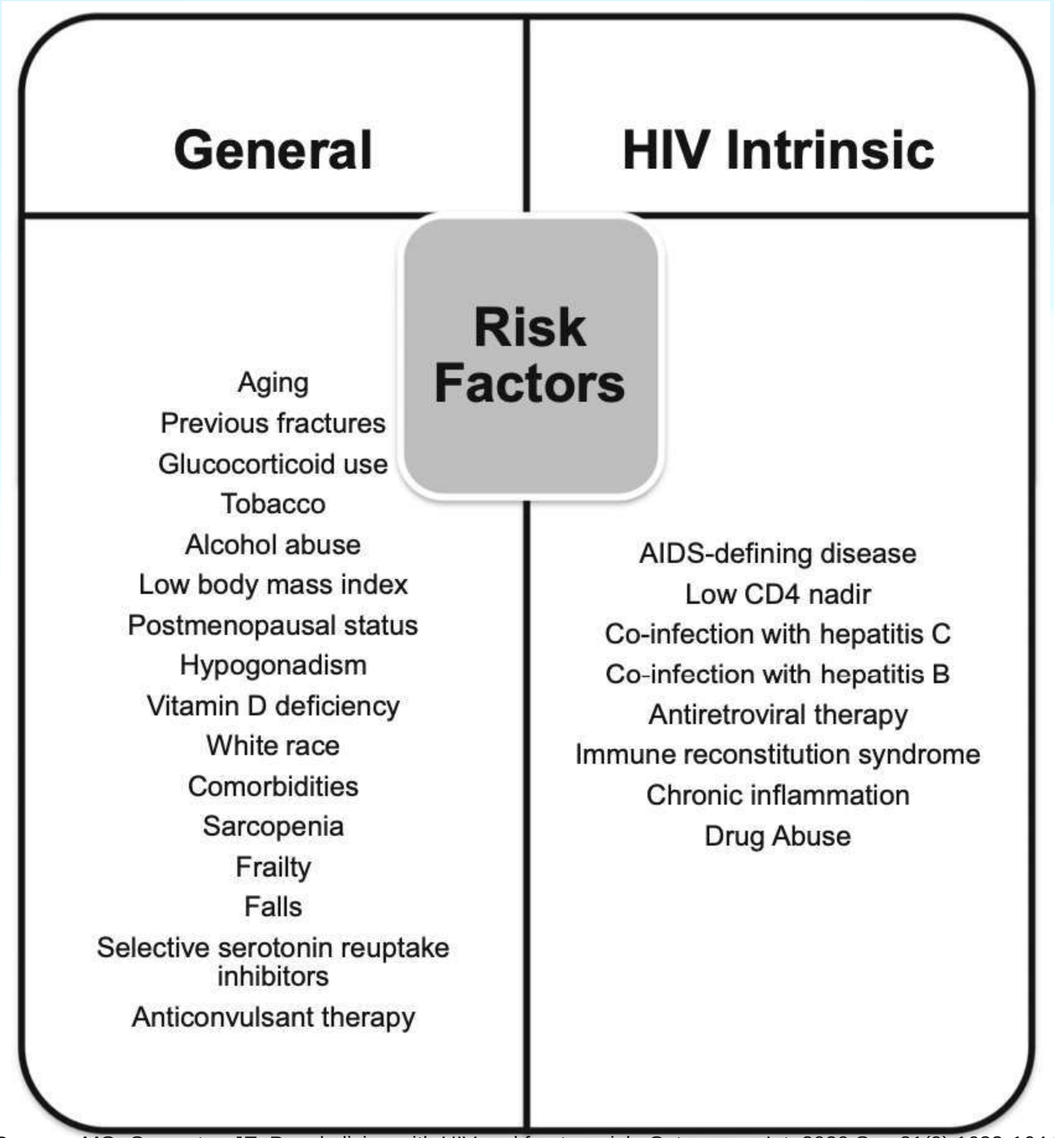
- Geleneksel risk faktörleri HIV’li bireylerde yaygın ve kemik sağlığı üzerine en etkili faktör
- Viral replikasyon ve immün rekonstütisyon sırasında kemik kaybı yaygın
- Enflamasyon, kronik immün aktivasyon
- ART

Biver E. (2022). Osteoporosis and HIV Infection. *Calcified tissue international*, *110*(5), 624–640. https://doi.org/10.1007/s00223-022-00946-4

Tang, M. J., Alexander, A., & Hoy, J. F. (2023). Gender and sex considerations in HIV and bone health. *Current opinion in HIV and AIDS*, *18*(2), 75–80. https://doi.org/10.1097/COH.0000000000000780

People living with HIV and fracture risk

M.O. Premaor[1] · J.E. Compston[2]



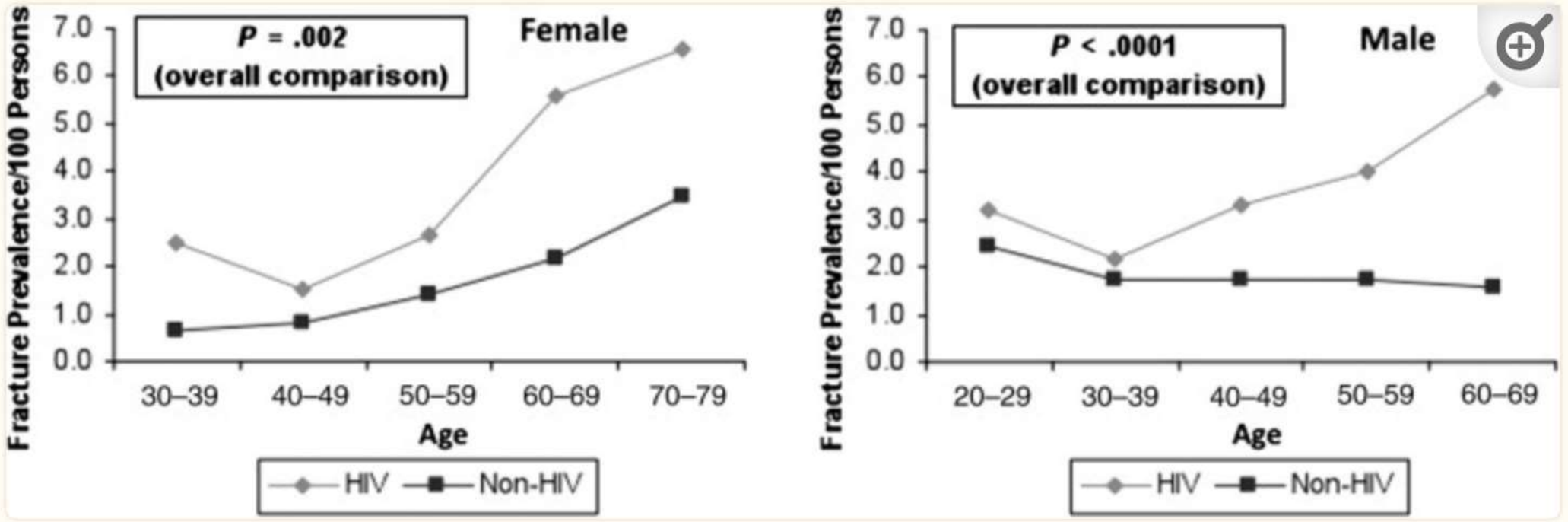
Premaor MO, Compston JE. People living with HIV and fracture risk. Osteoporos Int. 2020 Sep;31(9):1633-1644. doi: 10.1007/s00198-020-05350-y. Epub 2020 Mar 23. PMID: 32206852.

- Dünya’da durum

- Kırık riski

Bone Loss in the HIV-Infected Patient: Evidence, Clinical Implications, and Treatment Strategies

Vanessa Walker Harris and Todd T. Brown

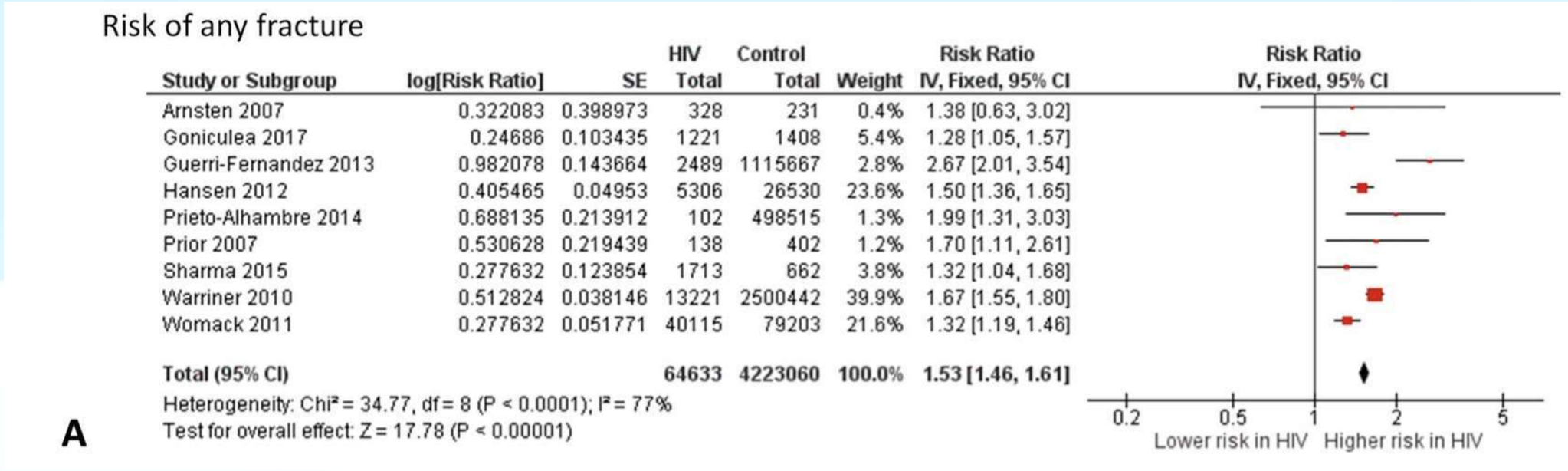


- Kırık riski, HIV'li hem kadın hem de erkeklerde daha yüksektir

Walker Harris, V., & Brown, T. T. (2012). Bone loss in the HIV-infected patient: evidence, clinical implications, and treatment strategies. *The Journal of infectious diseases*, *205 Suppl 3*(Suppl 3), S391–S398. https://doi.org/10.1093/infdis/jis199

Management of Osteoporosis in Patients Living With HIV–A Systematic Review and Meta-analysis

Jakob Starup-Linde [1], Simone Bruhn Rosendahl [1 2], Merete Storgaard [2], Bente Langdahl [1]



- Kırık riski, HIV'li kişilerde 1.28 - 2.67 kat daha yüksektir

Starup-Linde, J., Rosendahl, S. B., Storgaard, M., & Langdahl, B. (2020). Management of Osteoporosis in Patients Living With HIV-A Systematic Review and Meta-analysis. *Journal of acquired immune deficiency syndromes (1999)*, *83*(1), 1–8. https://doi.org/10.1097/QA

Management of Osteoporosis in Patients Living With HIV–A Systematic Review and Meta-analysis

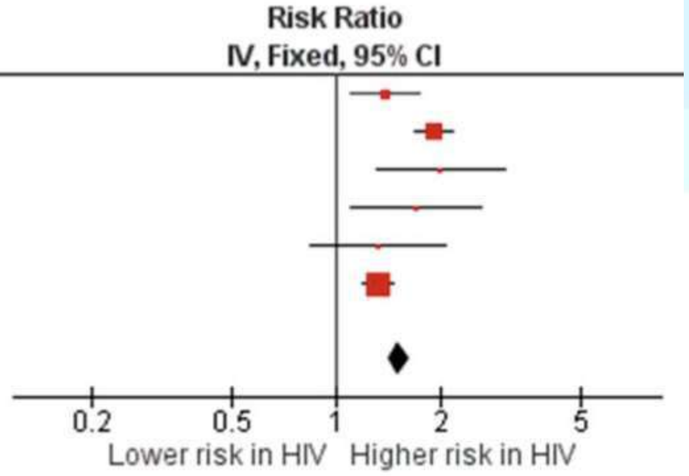
Jakob Starup-Linde [1], Simone Bruhn Rosendahl [1 2], Merete Storgaard [2], Bente Langdahl [1]

Risk of fragility fracture

Study or Subgroup	log[Risk Ratio]	SE	HIV Total	Control Total	Weight	Risk Ratio IV, Fixed, 95% CI
Goniculea 2017	0.322083	0.116004	1221	1408	10.0%	1.38 [1.10, 1.73]
Hansen 2012	0.641854	0.065773	5306	26530	31.2%	1.90 [1.67, 2.16]
Prieto-Alhambre 2014	0.688135	0.213912	102	498515	3.0%	1.99 [1.31, 3.03]
Prior 2007	0.530628	0.219439	138	402	2.8%	1.70 [1.11, 2.61]
Sharma 2015	0.277632	0.225823	1713	662	2.6%	1.32 [0.85, 2.05]
Womack 2011	0.277632	0.051771	40115	79203	50.4%	1.32 [1.19, 1.46]
Total (95% CI)			**48595**	**606720**	**100.0%**	**1.51 [1.41, 1.63]**

Heterogeneity: Chi² = 21.86, df = 5 (P = 0.0006); I² = 77%

Test for overall effect: Z = 11.29 (P < 0.00001)



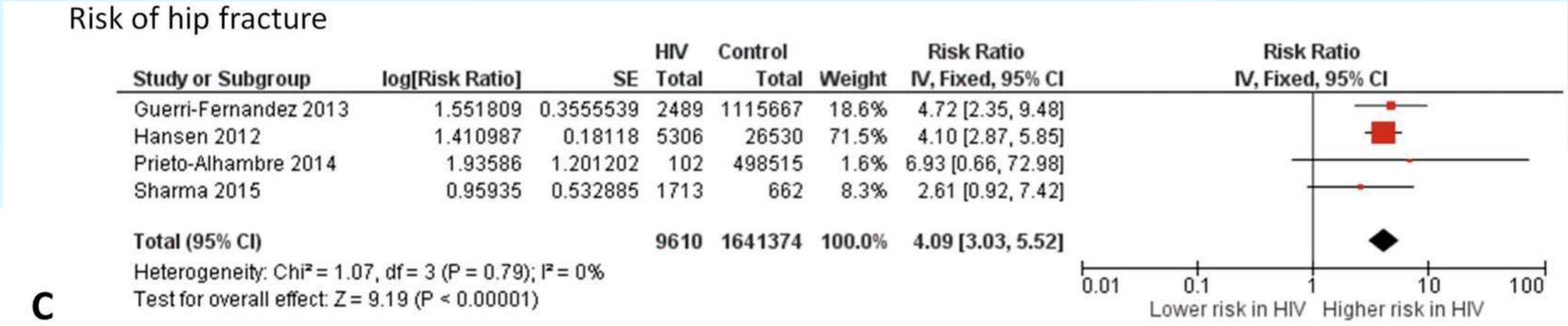
B

- Frajilite kırığı riski HIV'li kişilerde 1.32 - 1.99 kat daha yüksektir

Starup-Linde, J., Rosendahl, S. B., Storgaard, M., & Langdahl, B. (2020). Management of Osteoporosis in Patients Living With HIV-A Systematic Review and Meta-analysis. *Journal of acquired immune deficiency syndromes (1999)*, *83*(1), 1–8. https://doi.org/10.1097/QA

Management of Osteoporosis in Patients Living With HIV–A Systematic Review and Meta-analysis

Jakob Starup-Linde [1], Simone Bruhn Rosendahl [1 2], Merete Storgaard [2], Bente Langdahl [1]



C

- Kalça kırığı riski, HIV'li kişilerde 2.61 - 6.93 kat daha yüksektir

Starup-Linde, J., Rosendahl, S. B., Storgaard, M., & Langdahl, B. (2020). Management of Osteoporosis in Patients Living With HIV-A Systematic Review and Meta-analysis. *Journal of acquired immune deficiency syndromes (1999)*, *83*(1), 1–8. https://doi.org/10.1097/QA

- D vitamini

Vitamin D and Bone Mineral Density in HIV Newly Diagnosed Therapy-Naive Patients Without Any Secondary Causes of Osteoporosis

María Elena Ceballos[1] · Camila Carvajal[1] · Javier Jaramillo[2] · Angelica Dominguez[3] · Gilberto González[2]

- Şili'de 2014-2016 yıllarında
- Yeni tanı almış 18-50 yaş tedavi deneyimsiz HIV'li kişiler
- D vitamini düzeyleri kontrol grubuna göre daha düşük bulunmuş
- D vitamini %66 düşük

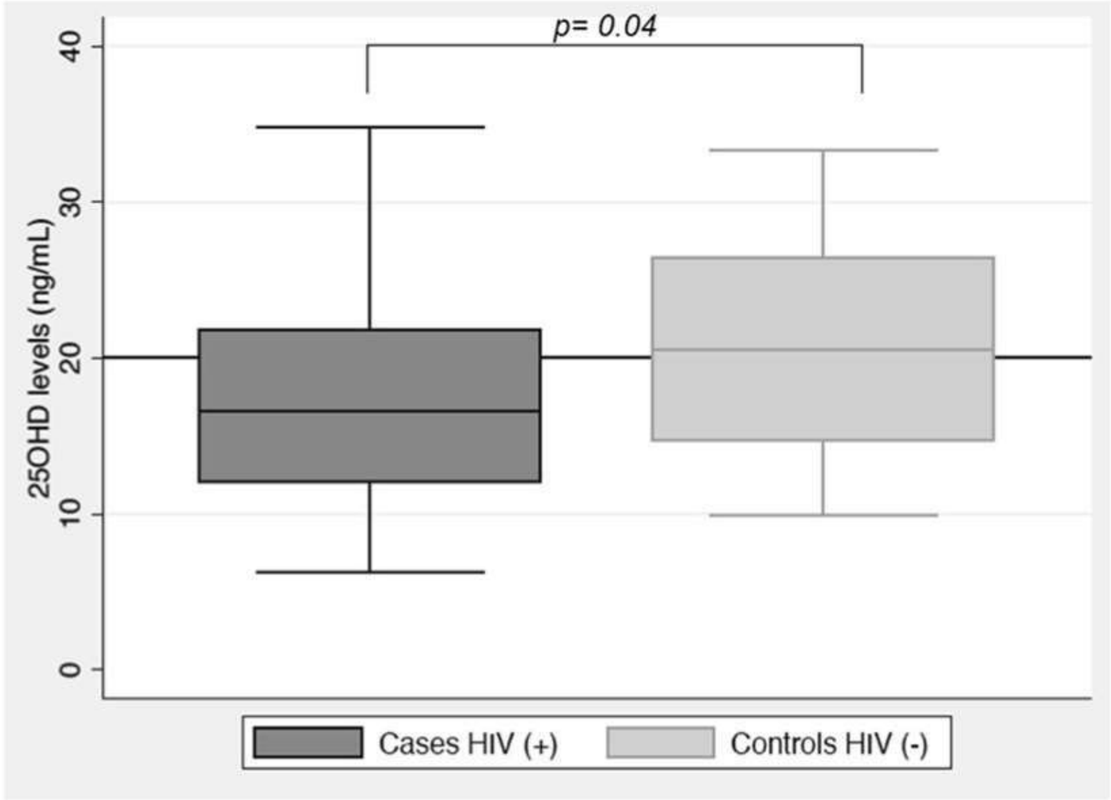


Fig. 2 Mean 25OHD levels in patients compared with controls

Ceballos, María Elena et al. "Vitamin D and Bone Mineral Density in HIV Newly Diagnosed Therapy-Naive Patients Without Any Secondary Causes of Osteoporosis." *Calcified tissue international* vol. 104,1 (2019): 42-49. doi:10.1007/s00223-018-0474-5

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María Elena Ceballos[1] · Camila Carvajal[1] · Javier Jaramillo[2] · Angelica Dominguez[3] · Gilberto González[2]

Table 3 Contributing factors for Vitamin D levels in HIV patients and controls

	Patients $n=70$	Healthy volunteers $n=21$	p value
Sex (male), %	100	100	
Age (years)	31.2 (8.0)	33.3 (8.2)	0.311
BMI (kg/m^2)	24.0 (3.0)	25.9 (2.7)	**0.009**
Season of the year, autumn/winter, %	61.4	52.4	0.459
Normal sun exposure (score ≥ 3), %	51.4	81.0	**0.016**
Sunblock use, %	35.7	4.8	**0.006**
Current smoker, %	74.3	14.3	**<0.001**
Vitamin D levels (ng/mL)	17.7 (6.6)	20.8 (7.0)	0.04

- D vitamini düzeyi ile ilişkili faktörler; **VKİ**, **güneşe maruz kalma**, **güneş koruyucu kullanma** ve **sigara** olarak bulunmuş

Ceballos, María Elena et al. “Vitamin D and Bone Mineral Density in HIV Newly Diagnosed Therapy-Naive Patients Without Any Secondary Causes of Osteoporosis.” *Calcified tissue international* vol. 104,1 (2019): 42-49. doi:10.1007/s00223-018-0474-5

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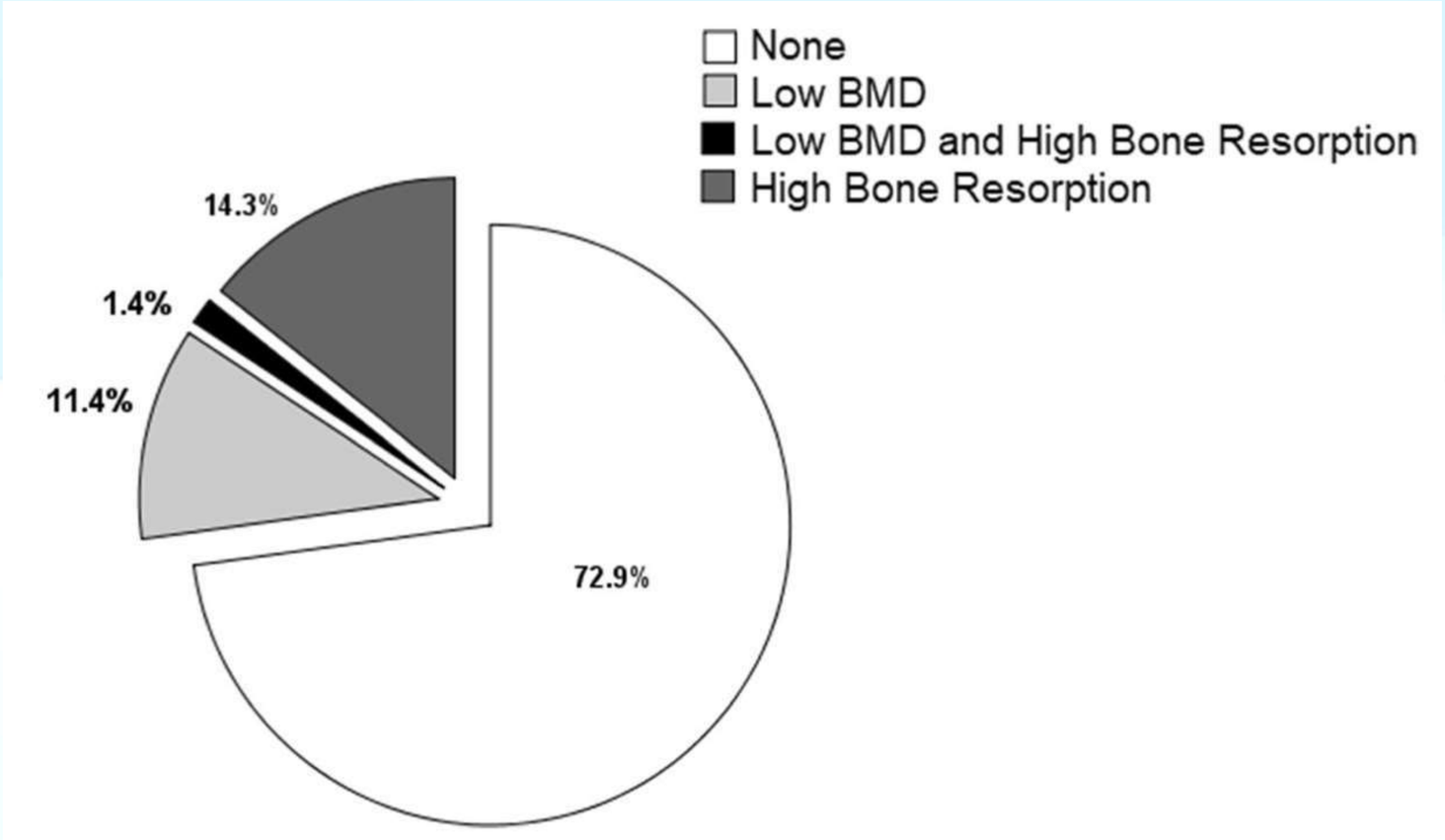

- Hastaların %13'ünde düşük KMD (Z skoru <2)

Ceballos, María Elena et al. "Vitamin D and Bone Mineral Density in HIV Newly Diagnosed Therapy-Naive Patients Without Any Secondary Causes of Osteoporosis." *Calcified tissue international* vol. 104,1 (2019): 42-49. doi:10.1007/s00223-018-0474-5

Vitamin D intakes among women living with and without HIV in Canada

- 95 HIV’li kadın, 284 kontrol
- HIV’li kadınlar;
  - Düşük gelir düzeyi
  - Düşük KMD
  - Sigara daha sık
  - Çok sayıda ilaç kullanan
  - Beyaz olmayan
- **D vitamini alımı daha düşük**
- **Ek takviye edici tedavi daha sık**

King, E. M., Swann, S. A., Prior, J. C., Berger, C., Mayer, U., Pick, N., Campbell, A. R., Côté, H. C. F., Murray, M. C. M., & CIHR team on Cellular Aging and HIV Comorbidities in Women and Children (CARMA) (2023). Vitamin D intakes among women living with and w

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- HIV’li kadınlar;
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  - Düşük KMD
  - **Sigara** daha sık
  - Polifarmasi
  - **Beyaz olmayan**
- **D vitamini alımı daha düşük**
- Ek destek tedavisi daha sık

- Bu gruplara D vitamini desteği düşünülmelidir

King, E. M., Swann, S. A., Prior, J. C., Berger, C., Mayer, U., Pick, N., Campbell, A. R., Côté, H. C. F., Murray, M. C. M., & CIHR team on Cellular Aging and HIV Comorbidities in Women and Children (CARMA) (2023). Vitamin D intakes among women living with and w

Frax skoru

Country: Turkey Name/ID: About the risk factors

Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth
   Age: Date of Birth: Y: M: D:
2. Sex — Male / Female
3. Weight (kg)
4. Height (cm)
5. Previous Fracture — No / Yes
6. Parent Fractured Hip — No / Yes
7. Current Smoking — No / Yes
8. Glucocorticoids — No / Yes
9. Rheumatoid arthritis — No / Yes
10. Secondary osteoporosis — No / Yes
11. Alcohol 3 or more units/day — No / Yes
12. Femoral neck BMD (g/cm^2)

Select BMD | Clear | Calculate

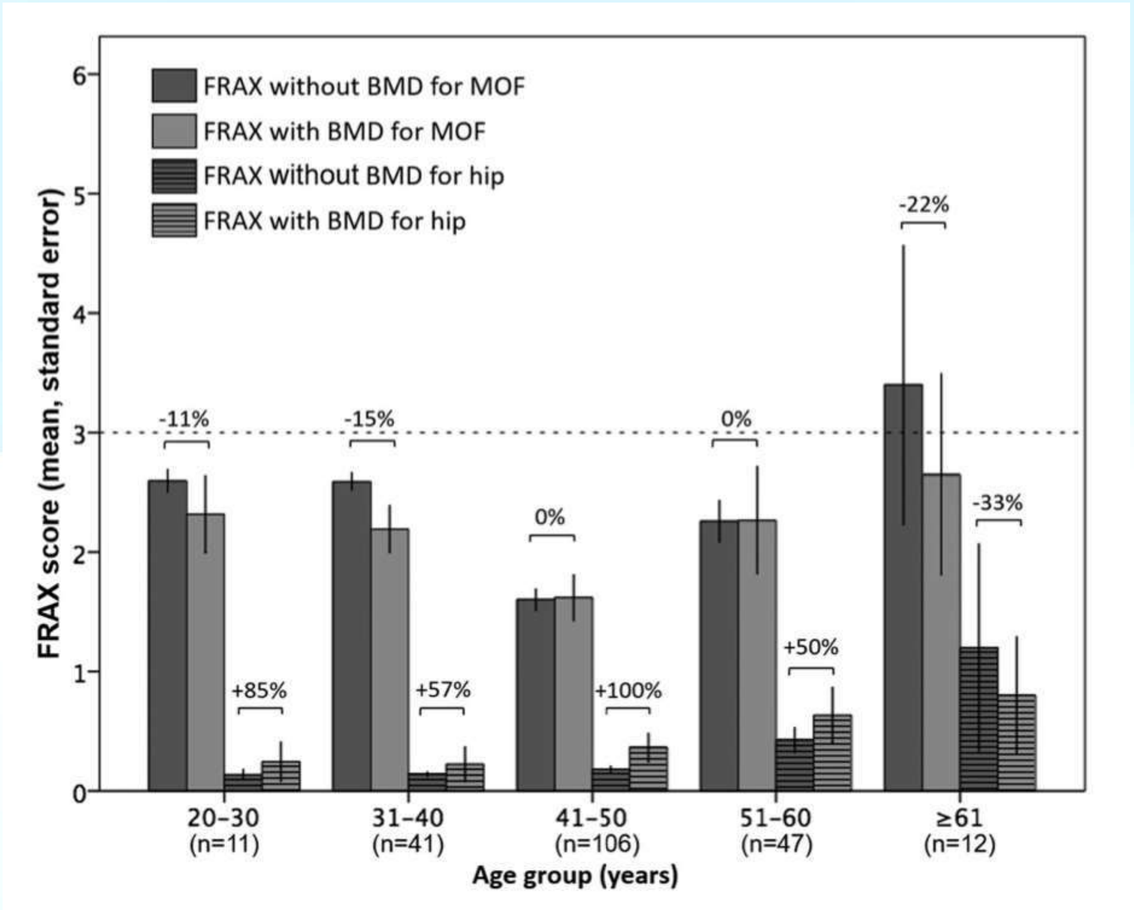
BMI: 26.9

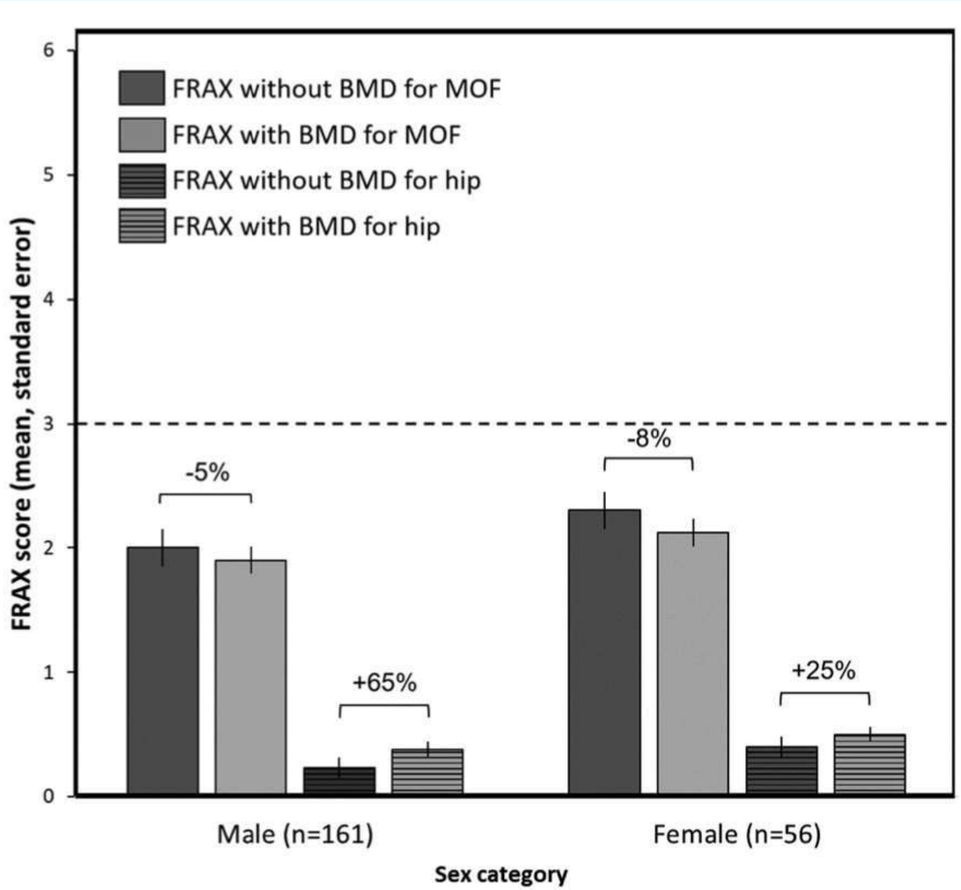
The ten year probability of fracture (%)

without BMD

Major osteoporotic	3.0
Hip Fracture	0.1

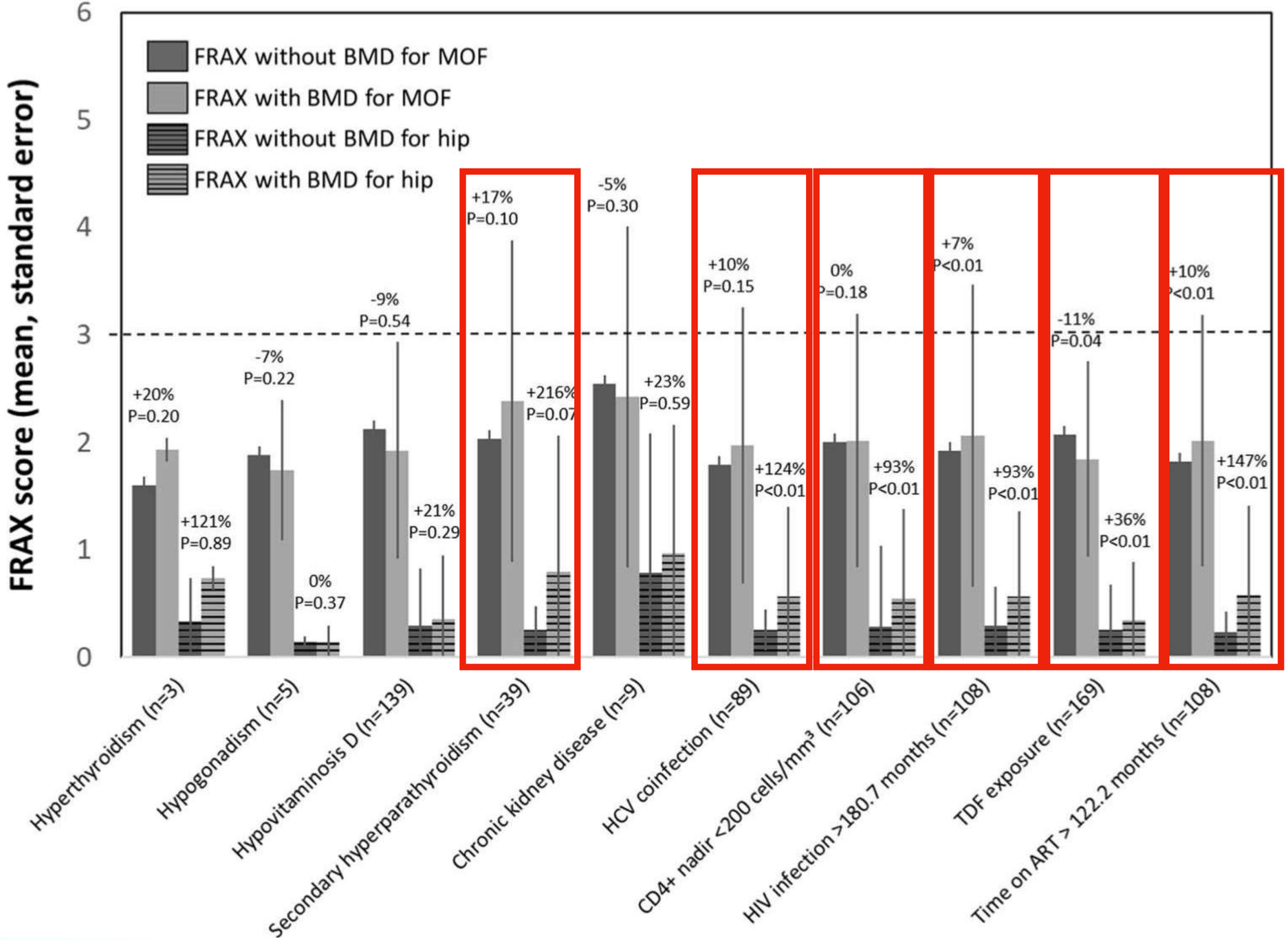
Evaluation of the fracture risk assessment tool for determining bone disease and the impact of secondary causes of osteoporosis in people living with HIV





- FRAX skoru, kemik mineral dansitesinin eklenmesiyle yaş ve cinsiyete göre önemli değişiklikler gösterir

Vizcarra, P., Gallego, J., Vivancos, M. J., Sifuentes, W. A., Llop, M., & Casado, J. L. (2020). Evaluation of the fracture risk assessment tool for determining bone disease and the impact of secondary causes of osteoporosis in people living with HIV. *HIV research & clini*



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Evaluation of the fracture risk assessment tool for determining bone disease and the impact of secondary causes of osteoporosis in people living with HIV

- Geleneksel ve HIV ile ilişkili risk faktörleri FRAX skorunu belirgin şekilde etkilemektedir
- Güncel FRAX eşik değerleri DEXA çekimi için kullanışsızdır
- Sekonder osteoporoz nedenlerinin sık görüldüğü bu hasta grubunda tanı ve tedavide gecikmeye neden olabilir

Vizcarra, P., Gallego, J., Vivancos, M. J., Sifuentes, W. A., Llop, M., & Casado, J. L. (2020). Evaluation of the fracture risk assessment tool for determining bone disease and the impact of secondary causes of osteoporosis in people living with HIV. *HIV research & clini*

Table 3 FRAX intervention thresholds according to Swiss Association against Osteoporosis guidelines for the general population [61]

Age	FRAX intervention threshold (MOF)
50 years	≥ 10%
55 years	≥ 13%
60 years	≥ 17%
65 years	≥ 20%
70 years	≥ 23%
75 years	≥ 28%
≥ 80 years	≥ 33%

Biver, E., Calmy, A., Aubry-Rozier, B., Birkhäuser, M., Bischoff-Ferrari, H. A., Ferrari, S., Frey, D., Kressig, R. W., Lamy, O., Lippuner, K., Suhm, N., & Meier, C. (2019). Diagnosis, prevention, and treatment of bone fragility in people living with HIV: a position statement f

- Osteopeni ve osteoporoz

Osteopenia and osteoporosis among treatment-experienced people living with HIV

Bárbara Marques de Castro Lara,[a] Cristiane Menezes de Pádua,[b] Cássia Cristina Pinto Mendicino,[b] and Gustavo Machado Rocha[a,*]

Bone densitometry		
Normal	48	52.2
Altered	44	47.8
Osteopenia	*26*	*28.2*
Osteoporosis	*18*	*19.6*

Final logistic regression model of factors associated with bone alteration among treatment-experienced PLHIV (N = 92).

Variables	**Adjusted OR (95% CI)**	**p-Value**
Age (50+ years old)	12.53 (4.37–35.90)	<0.001
Current alcohol use (yes)	2.63 (0.94–7.37)	0.066

Lara, B. M. C., Pádua, C. M., Mendicino, C. C. P., & Rocha, G. M. (2020). Osteopenia and osteoporosis among treatment-experienced people living with HIV. *The Brazilian journal of infectious diseases : an official publication of the Brazilian Society of In*

Risk Factors, Screening, Diagnosis, and Treatment of Osteoporosis in HIV-Infected Adults in an HIV Primary Care Clinic

Kevin Kwok

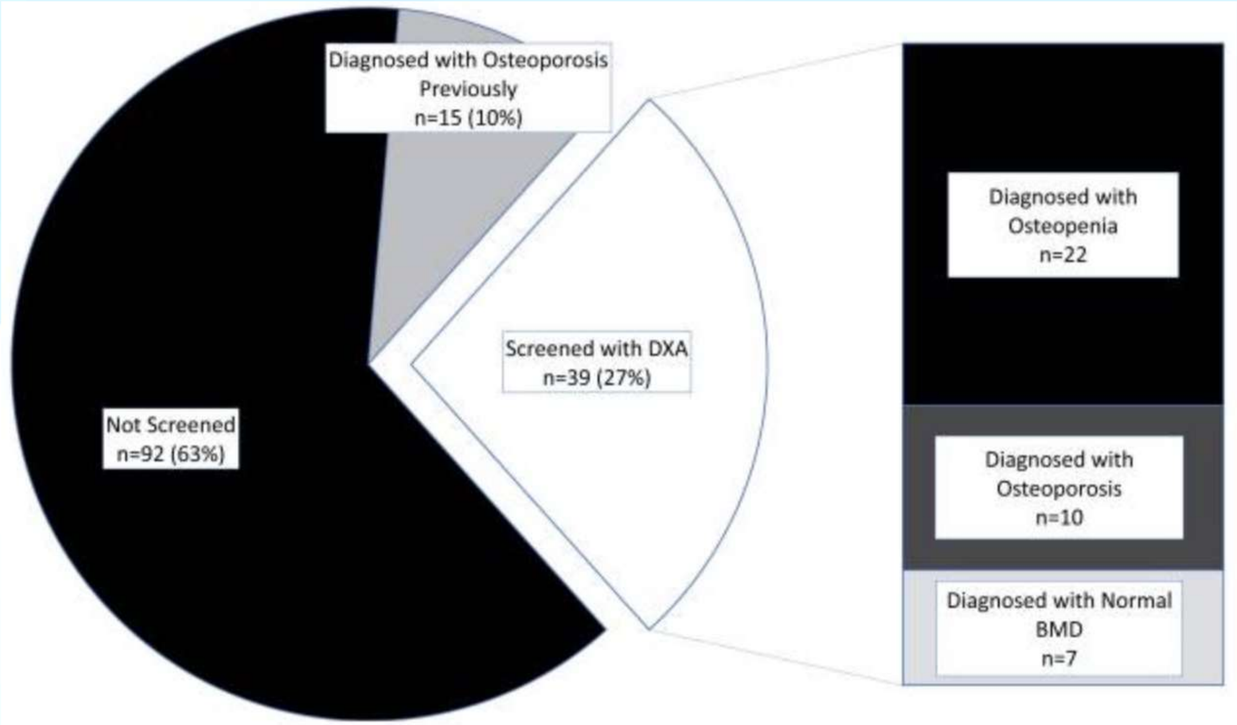
- Kanada’da
- 50 yaş üzerindeki kişiler
- 2 yıldan daha uzun takip süresi olanlar

Investigator-calculated FRAX score		
< 10% (low risk)	121	(83)
10%–20% (moderate risk)	20	(14)
> 20% (high risk)	5	(3)

Kwok, K., Olatunbosun, C., Ready, E., Sin, O., Toy, J., Spears, A., Lau, V., Bondy, G., & Stone, S. (2022). Risk Factors, Screening, Diagnosis, and Treatment of Osteoporosis in HIV-Infected Adults in an HIV Primary Care Clinic. *The Canadian journal of*

Risk Factors, Screening, Diagnosis, and Treatment of Osteoporosis in HIV-Infected Adults in an HIV Primary Care Clinic

Kevin Kwok



- DEXA ile tarama oranı düşük (1/3)
- DEXA bakılanlarda osteopeni ve osteoporoz sık
- Osteoporoz olan olguların %60'ı bifosfonat, D vitamini veya Ca almış
- Toplam hastaların %22'si Ca, %32'si de D vitamini almış

Kwok, K., Olatunbosun, C., Ready, E., Sin, O., Toy, J., Spears, A., Lau, V., Bondy, G., & Stone, S. (2022). Risk Factors, Screening, Diagnosis, and Treatment of Osteoporosis in HIV-Infected Adults in an HIV Primary Care Clinic. *The Canadian journal of*

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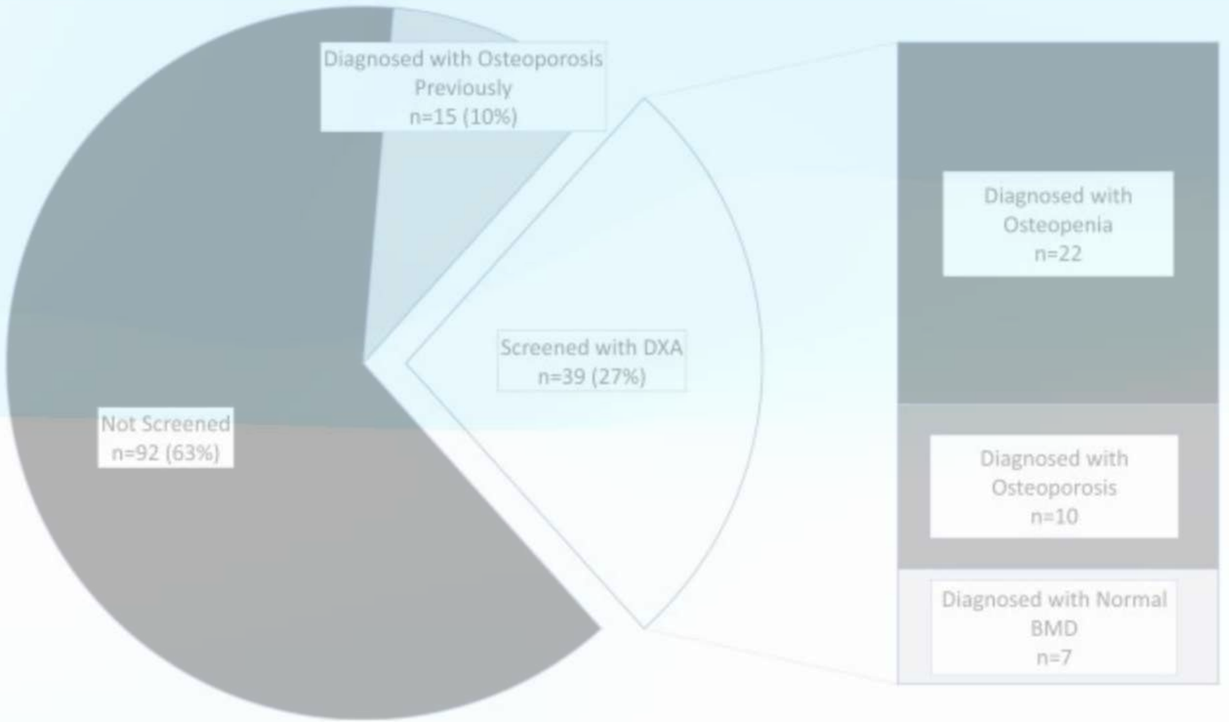

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- Toplam hastaların %22'si Ca, %32'si de D vitamini almış

- Kanada'da HIV'li 50 yaş üzerindeki kişiler arasında osteoporoz tanı ve tedavi oranı düşük

Kwok, K., Olatunbosun, C., Ready, E., Sin, O., Toy, J., Spears, A., Lau, V., Bondy, G., & Stone, S. (2022). Risk Factors, Screening, Diagnosis, and Treatment of Osteoporosis in HIV-Infected Adults in an HIV Primary Care Clinic. *The Canadian journal of*

LETTER TO THE EDITOR

Prevalence of osteoporosis in people living with HIV and risk factors associated in the cART era

- Fransa’da 2017-2022 arasında
- Sadece erkekler alınmış, 72 erkek
- %75 >50 yaş, **osteoporoz oranı %35, <50 yaş osteoporoz yok**
- %85’i 3’lü ART rejimi, 68/72’si <50 kopya/mL
- **Lomber osteoporoz %14, kalçada osteoporoz %21 saptanmış**
- Kırık yok
- TDF ve PI kullanımı ile ilişki yok, D vitamini ve 2’li ART ile ilişki yok
- **Düşük BKİ** (<22.5 kg/m^2) ve **önceden AIDS varlığı** bağımsız risk faktörleri olarak saptanmış

Vassallo, M., Fabre, R., Bolla, G., Manni, S., Durant, J., & Pradier, C. (2023). Prevalence of osteoporosis in people living with HIV and risk factors associated in the cART era. *HIV medicine*, *24*(10), 1088–1090. https://doi.org/10.1111/hiv.13516

Prevalence and Risk Factors of Low Bone Mineral Density in HIV/AIDS Patients: A Chinese Cross-Sectional Study

- Çin’de 2017-2020 arasında
- 1143 hasta
- **Tedavi deneyimsiz**
  - Düşük KMD %19, osteopeni %18.3, osteoporoz %1
- **ART alanlar**
  - Düşük KMD %32.2, osteopeni %29.8, osteoporoz %2.4
- **>50 yaş, VKİ <18.5, TDF** düşük KMD için risk faktörleri
- **Düşük HDL düzeyi koruyucu**

Meng, W., Chen, M., Song, Y., Zhang, H., Xie, R., & Zhang, F. (2022). Prevalence and Risk Factors of Low Bone Mineral Density in HIV/AIDS Patients: A Chinese Cross-Sectional Study. *Journal of acquired immune deficiency syndromes (1999)*, *90*(3), 360–368. https://d

Timing, Dosage, and Adherence of Antiretroviral Therapy and Risk of Osteoporosis in Patients With Human Immunodeficiency Virus Infection in Taiwan: A Nested Case-Control Study

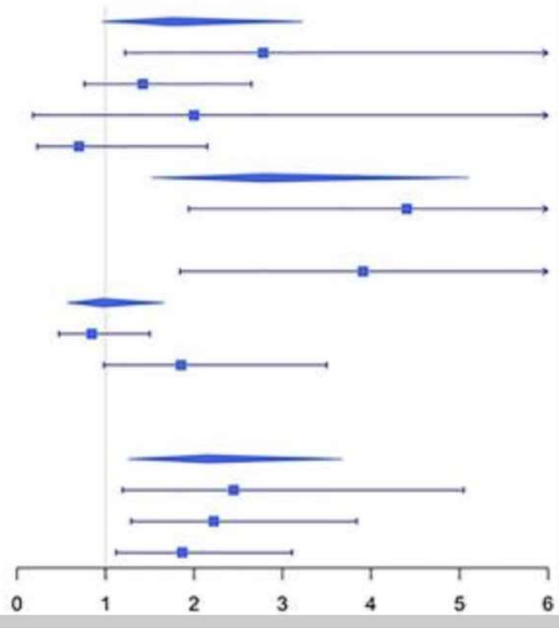
	Osteoporosis $N = 104$	Non-osteoporosis $N = 416$	OR	95% CI	*p-value*
	N (%)	*N* (%)			
ART drugs	—	—	—	—	—
Non-exposure	48 (46.15%)	242 (58.17%)	Ref	Ref	Ref
Exposure	56 (53.85%)	174 (41.83%)	2.11	(1.22–3.66)	0.0077
Timing of exposure	—	—	—	—	—
Non-exposure	49 (47.12%)	249 (59.86%)	Ref	Ref	Ref
Current exposure (0 < YEAR ≤1)	46 (44.23%)	132 (31.73%)	2.51	(1.38–4.56)	0.0026
Recent exposure (1 < YEAR ≤2)	8 (7.69%)	24 (5.77%)	2.42	(0.94–6.26)	0.0674
Past exposure (2 < YEAR)	1 (0.96%)	11 (2.64%)	0.65	(0.08–5.33)	0.6855
Cumulative defined daily dose (DDD)	—	—	—	—	—
Non-exposure	49 (47.12%)	249 (59.86%)	Ref	Ref	Ref
Low (cumulative DDDs < 2500)	24 (23.08%)	72 (17.31%)	2.26	(1.14–4.50)	0.0194
High (cumulative DDDs ≥ 2500)	31 (29.81%)	95 (22.84%)	2.48	(1.22–5.04)	0.0117
Adherence	—	—	—	—	—
Non-exposure	49 (47.12%)	249 (59.86%)	Ref	Ref	Ref
Low (0 < ADH ≤ 0.8)	32 (30.77%)	100 (24.04%)	2.32	(1.22–4.42)	0.0107
High (0.8 < ADH)	23 (22.12%)	67 (16.11%)	2.43	(1.21–4.89)	0.0125

- Tayvan’da ART alanlarda osteoporoz daha sık saptanmış
- <u>Osteoporoz riski</u>
  - ART’ye maruz kalanlar
  - Halen ART alanlar
  - Kümülatif ART dozu yüksek olanlar
  - Yüksek tedavi uyumu olanlarda

Chiu, M. L., Liang, W. M., Li, J. P., Cheng, C. F., Chiou, J. S., Ho, M. W., Wu, Y. C., Lin, T. H., Liao, C. C., Huang, S. M., Tsai, F. J., & Lin, Y. J. (2021). Timing, Dosage, and Adherence of Antiretroviral Therapy and Risk of Osteoporosis in Patients With

Timing, Dosage, and Adherence of Antiretroviral Therapy and Risk of Osteoporosis in Patients With Human Immunodeficiency Virus Infection in Taiwan: A Nested Case-Control Study

	Osteoporosis N=104 N (%)	Non-osteoporosis N=416 N (%)	OR	95% CI	p-value
NRTI-containing regimen	**29 (27.88%)**	**87 (20.91%)**	**1.76**	**(0.96-3.22)**	**0.0675**
Abacavir	12 (11.54%)	21 (5.05%)	2.78	(1.22-6.33)	0.0148
Lamivudine	24 (23.08%)	79 (18.99%)	1.42	(0.76-2.65)	0.2699
Tenofovir disoproxil	1 (0.96%)	2 (0.48%)	2.00	(0.18-22.06)	0.5714
Zidovudine	4 (3.85%)	22 (5.29%)	0.70	(0.23-2.15)	0.5337
PI-containing regimen	**33 (31.73%)**	**79 (18.99%)**	**2.78**	**(1.52-5.10)**	**<0.001**
Atazanavir	15 (14.42%)	19 (4.57%)	4.40	(1.94-10.02)	<0.001
Darunavir	0 (0.00%)	2 (0.48%)	NA	NA	NA
Ritonavir	20 (19.23%)	34 (8.17%)	3.91	(1.84-8.31)	<0.001
NNRTI-containing regimen	**29 (27.88%)**	**118 (28.37%)**	**0.97**	**(0.57-1.66)**	**0.9128**
Efavirenz	21 (20.19%)	94 (22.6%)	0.84	(0.47-1.50)	0.5627
Nevirapine	17 (16.35%)	41 (9.86%)	1.85	(0.98-3.50)	0.0568
Other ART-containing regimen	**1 (0.96%)**	**1 (0.24%)**	**NA**	**NA**	**NA**
Raltegravir (INSTI)	1 (0.96%)	1 (0.24%)	NA	NA	NA
Over two ART drugs-containing regimen	**52 (50%)**	**154 (37.02%)**	**2.15**	**(1.26-3.67)**	**0.0049**
Lamivudine and abacavir (NRTI/NRTI)	16 (15.38%)	34 (8.17%)	2.45	(1.19-5.05)	0.0155
Lopinavir and ritonavir (PI/PI)	29 (27.88%)	67 (16.11%)	2.22	(1.29-3.84)	0.0042
Zidovudine and lamivudine (NRTI/NRTI)	45 (43.27%)	133 (31.97%)	1.87	(1.12-3.11)	0.0164



- **Pİ içeren rejim** (x2.78) ve **2’den daha fazla ART** içeren rejimlerle (x2.15) osteoporoz arasında ilişki saptanmış

Chiu, M. L., Liang, W. M., Li, J. P., Cheng, C. F., Chiou, J. S., Ho, M. W., Wu, Y. C., Lin, T. H., Liao, C. C., Huang, S. M., Tsai, F. J., & Lin, Y. J. (2021). Timing, Dosage, and Adherence of Antiretroviral Therapy and Risk of Osteoporosis in Patients With

- Türkiye’de durum

Osteoporosis In Turkish HIV/AIDS patients: comparative analysis by dual energy X-ray absorptiometry and digital X-ray radiogrammetry

- 2005 yılında
- 27 hasta (15 erkek, 12 kadın)
- 14 hastada (%51.9) osteopeni, 9 hastada osteoporoz (%33.3)
- Semptom yok
- Kırık veya başka kemik patolojisi yok
- **Başlangıç CD4 sayısı** ile KMD korele

Özçakar, L., Guven, G.S., Ünal, S. *et al.* Osteoporosis In Turkish HIV/AIDS patients: comparative analysis by dual energy X-ray absorptiometry and digital X-ray radiogrammetry. *Osteoporos Int* **16**, 1363–1367 (2005). https://doi.org/10.1007/s00198-005-1847-y

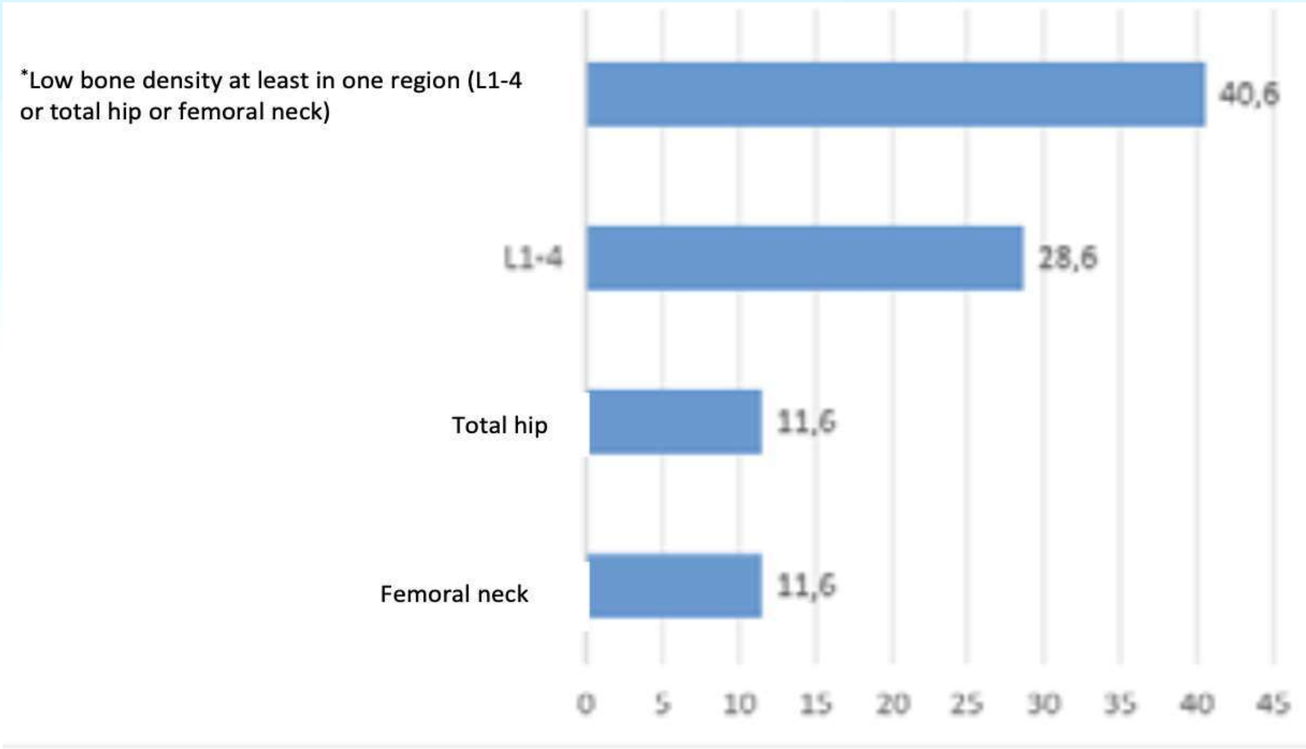
The Prevalence and Associated Factors of Reduced Bone Mineral Density (BMD) Among Men with Suppressed Viral Load Taking Antiretroviral Therapy

- Ocak - Aralık 2019
- ART alan ve virolojik olarak baskılanmış erkekler
- Yaş ortalaması 35, Z skoru kullanılmış (-1 - -2 osteopeni, <2 osteoporoz)
- Osteopeni %44.5, osteoporoz %21
- **HIV tanı süresi, ART süresi, TDF** ile düşük KMD arasında ilişki saptanmış

Ozcan, Safiye Nur et al. “The Prevalence and Associated Factors of Reduced Bone Mineral Density (BMD) Among Men with Suppressed Viral Load Taking Antiretroviral Therapy.” *Current HIV research* vol. 20,1 (2022): 74-81. doi:10.2174/1570162X19666211202100308

The evaluation of risk factors related to reduced bone mineral density in young people living with HIV

- 224 hasta
- Ortalama yaş 35.8
- %60 ART deneyimsiz
- %40.6 oranında düşük KMD saptanmış
- Düşük KMD ile **yüksek VKİ** ve **viral yükün >100.000 kopya/mL** olması anlamlı



Prevalence and risk factors of osteopenia/osteoporosis in Turkish HIV/AIDS patients

- 126 hasta
- Ortanca yaş 40.1, %84 erkek, %35.7 AIDS, %63.5 ART alıyor
- Osteopeni %53.9
- Osteoporoz %23.8
- **Yüksek viral yük** ve **ART süresi** ilişkili faktörler

Braz J Infect Dis 17 (6) • Dec 2013 • https://doi.org/10.1016/j.bjid.2013.05.009

- Olgu sunumu

Olgu

- 34 yaşında erkek
- 2014 Ekim ayında tanı almış
- HIV RNA: 3.460.000 kopya/mL
- CD4: %26 (611)
- HLA5701: Negatif
- TDF/FTC + LPV/r başlanmış (Ocak 2015)

Olgu

TARİH	**CD4** sayı/%	**HIV RNA** kopya/mL	**Tedavi**	
17.10.14	%26 (611)	3.460.000		
Ocak 2015			**TDF/FTC + LPV/r**	
18.02.15		4.440		
02.04.15	%35 (538)	-		
07.04.15		98.000	**TDF/FTC/EVG/c**	**Direnç testi**

Olgu

- Direnç testi (2015)
  - NRTİ direnci yok
  - NNRTİ düşük ve orta düzey direnç saptanmış, rilpivirine orta düzey direnç
  - PI direnci yok

Olgu

TARİH	CD4 sayı/%	HIV RNA kopya/mL	Tedavi	
17.10.14	%26 (611)	3.460.000		
Ocak 2015			**TDF/FTC + LPV/r**	
18.02.15		4.440		
02.04.15	%35 (538)	-		
07.04.15		98.000	**TDF/FTC/EVG/c**	**Direnç testi**
20.05.15	%39 (1241)	71.9	**TDF/FTC/EVG/c**	
08.09.15	%44 (1251)	332	**TDF/FTC/EVG/c**	
06.10.15	%38 (1100)	NEGATİF	**TDF/FTC/EVG/c**	

Olgu

- **2015 DEXA: Femur boynu osteopeni, lomber osteoporoz**
- Belirgin dislipidemi
  - D vitamini, Ca, Mg, bifosfonat
  - TDF/FTC + LPV/r'den TDF/FTC/EVG/c'ye geçildi (Mayıs-Kasım 2015)
- **2017 DEXA: Femur boynu osteopeni, lomber osteoporoz**
  - TDF/FTC/EVG/c'den ZDV/3TC + DTG'ye geçilmiş (2015-2018)

Olgu

- 2018 yılında TAF/FTC/EVG/c tedavisine geçilmiş
- **2019 DEXA: Femur boynu osteopeni, lomber osteoporoz**
- **2022 DEXA: Femur boynu osteopeni, lomber osteoporoz**
- 2022’de dislipidemi ve ilaç etkileşimi nedeniyle 3TC + DTG tedavisine geçilmiş
  - D vitamini, Ca, NSAİİ, PPİ, gabapentin, thioctic asit, fenofibrat, fluoksetin (duloksetin), trazodon, ketiapin

Olgu

Tarih	CD4	HIV RNA
15.2.2017		34.2
16.5.2017		NEGATİF
5.9.2017		NEGATİF
9.1.2018		NEGATİF
26.3.2018		26.8
14.5.2018		NEGATİF
7.9.2018		NEGATİF
4.12.2018		NEGATİF
5.3.2019		NEGATİF
29.5.2019		NEGATİF
26.11.2019		NEGATİF
3.3.2020		NEGATİF
11.8.2020		NEGATİF
15.6.2021		NEGATİF
1.12.2021		NEGATİF
19.07.2022	%56.6 1415	NEGATİF
31.01.2023	%55.7 1392	NEGATİF

Sonuç-1

- HIV’li kişilerde kırık riski daha yüksek
- HIV’li kişilerde D vitamini düzeyi ve alımı düşük
- ART alanlarda osteopeni ve osteoporoz daha sık
- Frax skoru kırık riskini tahmin etmede yetersiz
- Tanı ve tedavi oranı düşük

Sonuç-2

- Günlük yeterli kalsiyum ve vitamin D
- Egzersiz
- Hastalar osteoporoz açısından değerlendirilmeli ve uygun şekilde tedavi edilmeli

Recommendations for evaluation and management of bone disease in HIV

Todd T Brown [1], Jennifer Hoy [2], Marco Borderi [3], Giovanni Guaraldi [4], Boris Renjifo [5], Fabio Vescini [6], Michael T Yin [7], William G Powderly [8]

Causes of Secondary Osteoporosis

Osteoporosis-Associated Condition	Laboratory Evaluation
Endocrine disorders	
Vitamin D deficiency[a]	25-hydroxy vitamin D
Hyperparathyroidism[a]	Intact parathyroid hormone, total calcium, phosphate, albumin, creatinine
Subclinical hyperthyroidism[a]	Thyroid-stimulating hormone, free thyroxine
Hypogonadism[a]	Men: free testosterone with morning measurement; women: menstrual history, estradiol, follicle-stimulating hormone, prolactin
Cushing syndrome	1 mg overnight dexamethasone suppression test or late-evening salivary cortisol levels
Renal disorders	
Phosphate wasting[a]	Simultaneous serum phosphate and creatinine and spot urine phosphate and creatinine to calculate fractional excretion of phosphate
Idiopathic hypercalcuria[a]	24-hour urinary calcium
Gastrointestinal disorders	
Celiac sprue	Immunoglobulin A tissue transglutaminase antibody
Hematologic disorders	
Multiple myeloma	Complete blood count, serum protein electrophoresis
Mastocytosis	Serum tryptase

Risk factors required for FRAX [6] (Supplementary References 15–24)

- Age
- Race/geographic location
- Female sex
- BMI/height and weight
- Prior fragility fracture
- Parental history of hip fracture
- Current tobacco smoking
- Alcohol ≥3 standard drinks per day
- Long-term use of glucocorticoids (≥5 mg prednisone per day or equivalent for >3 mo)
- Rheumatoid arthritis
- Secondary causes of osteoporosis[a]

Additional risk factors important for fracture risk assessment

- Frailty/fall risk/physical inactivity (Supplementary Reference 25)
- Vitamin D deficiency (Supplementary Reference 26)

Brown, T. T., Hoy, J., Borderi, M., Guaraldi, G., Renjifo, B., Vescini, F., Yin, M. T., & Powderly, W. G. (2015). Recommendations for evaluation and management of bone disease in HIV. *Clinical infectious diseases : an official publication of the Infectious*

Prevalence of osteoporosis and osteopenia in a cohort of HIV positive women with a history of treated neoplasms

Cecilia Rivera-Díaz,[1] P Volkow-Fernández,[1] José Luis Villalobos,[2] and P Cornejo-Juárez[1]

Measuring site	DXA result	HIV positive patients with cancer ($n = 48$)	HIV negative with cancer diagnosis ($n = 48$)	p [a]	HIV negative without cancer ($n = 48$)	p [b]
Femoral neck	DXA value[c]	−1.4 (−1.9 to −0.7)	−0.5 (−1.4 to 0.17)	0.001	−0.5 (−1.25 to 0.15)	0.597
	Osteopenia[d]	26 (54.2)	18 (37.5)	0.02	13 (27.1%)	0.243
	Osteoporosis[e]	6 (12.5)	1 (2.1)	0.03	0	n/a
Spine	DXA value[c]	−2.4 (−2.9 to −1.55)	−1.3 (−2.2 to −0.6)	<0.001	−0.75 (−0.15 to −2)	0.119
	Osteopenia[d]	17 (35.4)	23 (47.9)	0.442	15 (31.25)	0.06
	Osteoporosis[e]	23 (47.9)	8 (16.7)	0.002	7 (14.6)	0.380

- HIV ve kanseri olan kadınlarda osteoporoz daha sık
- **VKİ <24 kg/m2, menopoz** ve **HIV enfeksiyonunun süresi** osteoporoz ile ilişkili faktörler

Rivera-Díaz, C., Volkow-Fernández, P., Villalobos, J. L., & Cornejo-Juárez, P. (2021). Prevalence of osteoporosis and osteopenia in a cohort of HIV positive women with a history of treated neoplasms. *SAGE open medicine*, *9*, 20503121211037471. https://doi.org/10