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7.2. REFERENCE DATA AND ASSOCIATED VALUES

Reference data are used to compare the individual to a population. The average values acquired from a DXA scan, such as aBMD, BMC, PCTFM, etc., differ between groups by age, sex and ethnicity. Therefore, there have been many studies to describe a variety of ethnicities for both sexes. For example, Fig. 29 shows total hip aBMD versus age for Hispanic, black and non-Hispanic Caucasians for both males and females living in the United States of America [141]. Care must be used to compare individuals to the reference curves that best match their age, sex and ethnicity if looking for normality. For example, if the aBMD of a black male is compared to the Caucasian male reference curve, the black male would appear to have unusually high aBMD for his age, when in fact the aBMD may be normal when compared to other black men. Much of these differences can be attributed to bone size.

Reference data have two practical purposes for DXA systems: determining fracture risk (T scores) and determining how an individual compares to their peers (Z scores). When determining fracture risk with values such as the T score, it may be appropriate to compare everyone, men and women of different ethnicities, to the same reference curve after adjustments

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**FIG. 29.** Hip reference data from the NHANES III Study [141]. aBMD is shown in standardized sBMD units (plot courtesy of J. Shepherd, UCSF).
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