Frontal, sagittal, and oblique plane malalignment can also result from ligament laxity. This type of malalignment is dynamic. Varus and valgus malalignment can occur because of MCL and lateral collateral ligament (LCL) laxity. LCL laxity produces symptoms secondary to dynamic varus malalignment. It should be noted that this discussion deals only with the attenuated, gradually stretched ligament and not with the acute traumatically torn ligament. The most common causes of lateral laxity are chronic stretch due to bony varus malalignment and overgrowth of the fibula (Fig. 14-1). Varus bone deformities occur in association with Blount’s disease, rickets, and medial compartment osteoarthritis. Fibular overgrowth is seen in association with growth arrest of the tibia and dysplasias such as achondroplasia, hypochondroplasia, and pseudoachondroplasia.

**LCL Laxity**

The LCL is a very important primary knee joint restraint. It acts as a static restraint to the varus moment arm about the knee that is experienced with each step during single-leg stance (Fig. 14-2) (Maquet 1984). In so doing, it reduces horizontal shear forces about the knee. During single-leg stance, the center of gravity is located medial to the planted knee joint. The hip abductors act to resist the varus moment arm at the hip level. The LCL, the fascia lata, and the anterior cruciate ligament (ACL) act to resist this moment arm at the knee. Even in the normally aligned lower extremity, there is a chronic varus moment arm on the LCL. If there is a varus deformity of the femur and/or tibia with medial MAD, the varus moment arm is greatly increased. The LCL gradually stretches, resulting in lateral laxity. The fascia lata and the ACL are secondary restraints and are not strong enough to protect the LCL from the pathological forces applied to it by the malalignment. Once LCL laxity is present, the primary resistance to the varus moment arm is gone. With each step, the lateral side of the joint will wedge open until it is restrained by the tautness of the stretched out LCL or by the ACL and the fascia lata. This buckling of the joint, observed clinically with each step, is called *lateral thrust* (Fig. 14-3a). With each step, in addition to the bony varus deformity, which is fixed and static, there is a dynamic varus deformity due to the LCL laxity. An analogous situation can exist in genu valgum, with lateral MAD from bony valgus leading to attenuation of the MCL. This causes *medial thrust* (Fig. 14-3b).

LCL laxity is also found with valgus deformity of the distal femur, especially in association with varus of the proximal tibia (Fig. 14-4). If the valgus is of congenital or developmental origin, there is often a partial or complete compensatory varus that develops. The valgus femur produces a sloped joint line, which leads to a lateral shearing force of the tibia on the femur. This stretches out the MCL, leading to lateral subluxation of the tibia on the femur (Fig. 14-4). It is this lateral subluxation that produces LCL stretch and laxity.

LCL laxity also occurs in association with many dysplasias. In achondroplasia, pseudoachondroplasia, and
CHAPTER 14 · Malalignment Due to Ligamentous Laxity of the Knee

mL DFA = 93°
JLCA = 11°
MPTA = 83°

mL DFA = 108°
JLCA = 11°
MPTA = 78°