ANATOMY AND BIOMECHANICS Applied anatomy

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The hip is a ball-and-socket joint formed by the head of the femur and the cup-shaped acetabulum (Latin: ‘little vinegar cup’) (Figure 39.1). The joint allows a considerable range of movement in di ff erent planes and is still inherently stable because of its bony anatomy and the static and dynamic stabilisers. The static stabilisers are composed of the iliofemoral and pubofemoral ligaments anteriorly and the ischiofemoral ligament posteriorly; together with the joint capsule and the labrum (Figure 39.1). The muscles running across the joint (short external rotator muscles and gluteus maximus posteri orly , the iliopsoas anteriorly and the hip abductors laterally) constitute the dynamic stabilisers. The acetabular labrum is a fibrocartilaginous structure that is triangular in cr oss-section and attaches to the rim of the acetabulum, except at its base, where it is replaced by a ligament called the transverse acetabular ligament. The labrum helps in deepening the socket, thereby enhancing stability . It also acts as a fluid seal and thereby helps to improve joint lubrication. The femoral head derives its blood supply mainly from the retinacular branches of the medial circumflex femoral artery and has a small contribution from the artery of the ligamentum teres. Summary box 39.1 Anatomy /uni25CF - /uni25CF /uni25CF /uni25CF

Sacrum Ilium Acetabular labrum Acetabular fossa Femoral head Capsule attachment Ligamentum teres Figure 39.1 Anatomy of the hip joint. The principles of joint replacement including important • complications The advances in surgical practice in this /f_i eld • The hip joint is a ball-and-socket joint, with both static and dynamic stabilisers Static stabilisers include the capsule, ligaments and labrum Dynamic stabilisers consist of the muscles acting across the joint Blood supply to the femoral head is mainly derived from the medial circum /f_l ex femoral artery Pubofemoral ligament Iliofemoral ligament Greater trochanter Lesser trochanter Pubis Ischium Pubic symphysis

Kinetic analysis reveals that forces as high as three times body weight can be exerted across the hip joint during activities of daily living, and eight times body weight during physically demanding activities. This is primarily the result of contraction of muscles crossing the hip joint. The abductors, because of their insertion at the greater trochanter, help in supporting the pelvis when the patient stands on the ipsilateral leg and thereby form the basis of the Trendelenburg test (Figure 39.2). Summary box 39.2 Forces going through the hip joint /uni25CF /uni25CF /uni25CF

Lifting leg from bed – one and a half times body weight Standing on one leg – three times body weight Running and jumping - ten times body weight

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