Indications, Localization and Preoperative Planning of Proximal Femoral Osteotomies in Posttraumatic States

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Indications

Nonunions of the femoral neck with a viable head and deformities secondary to fractures are the most frequent indications for posttraumatic osteotomies of the proximal femur. Corrective osteotomy may also be indicated for partial avascular necrosis of the femoral neck, for contractures secondary to pelvic fractures, and after the healing of an avascular femoral head necrosis in which the articular cartilage is reasonably well preserved. Traumatic separation of the epiphysis in young patients may also be mentioned in this context.

Localization

The proximal femur may be osteotomized in the subtrochanteric region, intertrochanteric region, or through the femoral neck. Subtrochanteric osteotomies have been largely abandoned, because the abduction produces a medialization of the shaft which decreases the angle between the mechanical axis and anatomic axis to zero, producing a marked genu valgum, and also because a corrective osteotomy will be necessary prior to a proposed total hip replacement. Another factor to be considered is the relatively long healing time of diaphyseal osteotomies compared with osteotomies performed through the cancellous bone of the intertrochanteric region. Femoral neck osteotomies are reserved for epiphyseal plate separations with more than 50° posterior slip of the femoral head.

In the intertrochanteric region, which is the site of choice, it is easy to perform any desired angular correction in the frontal, sagittal and horizontal plane and to displace the distal fragment laterally, medially, anteriorly or posteriorly as needed. In this type of osteotomy the length of the femur and the position of the greater trochanter and weight-bearing part of the head should always be evaluated before and after the procedure.

Preoperative Planning

Pre-requisites

An accurate diagnosis based on clinical and roentgenographic findings, a clear understanding of the goal of the chosen procedure, and the selection of a
satisfactory operating technique and reliable implant are necessary preliminaries to the preoperative planning of the end result and the tactical steps necessary to achieve it.

These points will be illustrated in the planning of an intertrochanteric osteotomy for treatment of a nonunion of the femoral neck.

*Nonunion of the Femoral Neck*

It is known that every reactive “elephant-foot” type of nonunion will unite after relative micromotion between the fragments has been eliminated, allowing mineralization of the interposed fibrocartilage and its invasion by bone-forming vascular tissue [7].

In 1927 Pauwels [6] recognized that a nonunion of the femoral neck would consolidate within a few months if shear stresses acting on the nonunion were transformed into compression. Even today, Pauwels’ principle of reorienting the nonunion at right angles to the resultant force R by resecting a laterally based wedge of bone retains its validity.

Pauwels used an abduction cast to stabilize his osteotomies. Since 1959 we have used a 120° double-angled blade plate to fix the osteotomy internally, and we do not apply plaster after surgery. In a nonunion, appositional movement

**Fig. 1 a—d.** Reactive nonunion of the femoral neck.

- **a** The proximal fragment is partially destroyed by the plate. Osteoporosis and bone formation caudally are evidence that the head is viable.
- **b** One month after repositioning osteotomy.
- **c** One year later.
- **d** Twelve years after intertrochanteric osteotomy. There is slight flattening of the femoral head, and the patient is free of complaints.