

SPECIAL SITUATIONS

OPEN FRACTURES

External Fixation

In open **tibial** shaft fractures, fractures associated with compartment syndrome, or in the polytraumatized patient who is deemed too hemodynamically unstable to undergo definitive fixation.

A spanning external fixation frame used for the acute management of a type IIIB open proximal **tibial** shaft **fracture**.

Intramedullary Nailing

In Court-Brown: 1106 **tibial** shaft fractures treated with an intramedullary nail, infection rates ranged from 6.9% to 16.4% as Gustilo open **fracture** types went from type I to type IIIB.

The rates of aseptic nonunion also increased according to open **fracture** grade, ranging from 12.1% for type I open fractures to 49% for type IIIB open fractures.

Damage Control Orthopaedics

External fixation still has an important role in its use as temporary stabilization.

Secondary Intramedullary Nailing: In damage control surgery in the severely injured patient, external fixation is often the treatment of choice because of its rapid application.

Data from the studies suggests that decreased duration of external fixation frame results in an 83% reduction in the risk of infection when compared a period of external fixation that exceeds 28 days.

SEGMENTAL TIBIAL DEFECTS

Traumatic bone loss is most commonly seen in the tibia because of its subcutaneous location.

While the overall incidence of fractures associated with bone loss is generally low, the literature suggests that **tibial**

75%.

While cases of reimplantation of large segments of bone have been described in adolescents, this is not advocated in the

majority of open fractures.

The OTA classification of bone loss consists of three types, Type 1 bone loss involves less than 50% of the bone diameter, type 2 involves more than 50% of the bone circumference, and type 3 involves segmental loss. Bone loss is not uncommon. It can occur in 10% open fractures.

Robinson suggest that critical size defects less than 6 cm are amenable to bone grafting techniques, and those more than 6 cm require other reconstructive options.

Defects up to 6 cm are treated with an intramedullary nail, if possible, and a later bone graft procedure is undertaken after first ensuring adequate soft tissue coverage. With defects more than 6 cm, careful planning is needed, the options being nailing, with lengthening over the nail, immediate fine-wire tensioned frame application with later bone transport, or immediate shortening and subsequent lengthening or external fixation with planned free fibula transfer.

Surgical issues include the condition of both soft tissue and bone donor sites and the availability of surgical expertise in using microvascular tissue transfer techniques or complex fine-wire external fixation frames.