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Interlocking intramedullary nailing in the treatment of femoral and tibial non-union

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In 1979-1983, five femoral and seven tibial non-unions were treated using Grosse Kempf dynamic interlocking intramedullary nailing (IIMN) with screw(s) at one end of the nail. The age range was 29-80 years and the operation was performed from 6 to 34 months after the fracture. Six fractures had been caused by high energy trauma and three fractures had been compound. Dividing the bone into six longitudinal segments, three fractures were located in the 1st of 6th segment, seven in the 2nd or 5th segment and the remaining two fractures in the middle segments. All femoral fractures had been treated primarily by plate osteosynthesis, whereas the prior management of most tibial fractures had been non-operative. In eight cases the IIMN was performed by the open technique, four non-unions were treated by the closed method. A simultaneous bone grafting was performed in the first case of the series. It was considered unnecessary in the later cases.

All non-unions underwent radiological healing between 10 and 40 (median 13) weeks. Full weight-bearing was allowed 7-40 (median 10) days postoperatively. The follow-up extended to a full recovery of function, varying from 5 to 40 (median 20) months. No infections were experienced. Two minor femoral and one tibial recurvation 10°/external rotation 20° were found. All patients gained full range of motion of the joints.

We conclude that intramedullary reaming in connection with the nailing gives an adequate osteogenic stimulus. The dynamic nailing gives sufficient stability and allows compression by weight-bearing. The method is suitable over a long range of the metaphysis/diaphysis of the femur and tibia.

Experiences with the non-cemented Aesculap PM hip prosthesis

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Bone cement or methylmethacrylate revolutionized hip surgery 20 years ago. Nevertheless, many problems and complications of total hip surgery are closely related to the bone cement. The complications may be seen during the operation or soon afterwards (thermic and toxic complications), but most complications relate to loosening or infections. Much effort has been made to solve these problems and different types of non-cemented hip prostheses are available. They must meet the following demands:

1. The materials in the processes must be biocompatible.
2. The artificial joint must have low friction.
3. Any wearing debris from the prosthesis must be atoxic.
4. The construction and biomechanical properties must be such that they give a durable fixation to the bone tissue.

Titanium has shown properties of great inertness, great strength and resistance against fatigue fracture and as an alloy with aluminium and vanadium, it has an elasticity module which is closer to cortical bone than alloy CrCo or stainless steel. If the artificial joint is constructed with (aluminiumoxide) ceramic and polyethylene, friction is considerably less than with conventional metal against polyethylene.

The Aesculap PM prosthesis is made of titanium, aluminium and vanadium alloy, combined with ceramic articulating with polyethylene.

During the last 2 years I have inserted nearly 60 Aesculap PM cementless prosthesis, of which 30 have been followed for 1½ years (ten men (age 49 years) and 20 women (age 56 years)). Three of the

prostheses show signs of loosening of the femoral stem. All three were due to technical errors: in one case the femoral stem was obviously too small and in the other two the stem was a little too thick, resulting in a femoral fracture (fissure) without dislocation. These complications can be avoided by proper surgical technique. All the other patients still show excellent primary results after 1½ years, which is of course too short a period to draw any conclusions.

The prosthesis has been shown to be a very valuable alternative in revising a loose cemented hip prosthesis.

Küntschers condylocephalic intramedullary nailing for trochanteric fractures in elderly patients

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In 1982, 122 patients (92 women and 30 men) underwent condylocephalic nailing for trochanteric fractures. Eighty-six per cent of them were older than 70 years of age. The study was scheduled to analyse the importance of the surgical technique for early technical complications.

The percentage of surgical complications was: deep infection – 2, perforation of the femoral head by a nail – 16 (peroperative perforation – 3), poor fixation of the nail in the femoral head – 3, and fracture of the shaft at the insertion site – 3. In 12 per cent of the cases a reoperation was necessary: removal of the nail – 7, change to a shorter nail – 2, and change to a nail-plate osteosynthesis – 3.

The results were significantly ($P < 0.01$) better in cases with an intact lesser trochanter (AO type A1) than in cases with medial-posterior comminution. A cranial position of the nail and a distance shorter than 1 cm between the cartilage and nail tip were both significantly ($P < 0.05$) associated with perforation of the head. The most expedient insertion site

of the nail was found to be at the level of the proximal pole of the patella.

We conclude that, with due consideration to the details of the surgical technique, condylocephalic nailing is a useful alternative in geriatric patients with type A1 trochanteric fracture.

Staging and management of bone tumours

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Accurate staging of bone tumours is very important in analysing treatment results in the new active phase of management, in which adjuvant chemotherapy and extremity-conserving surgery are central features. The success of therapy in malignant bone tumours (grades G1 and G2) obviously depends on the stage at which the tumour is encountered. We feel that the relation of the tumour to the compartment boundary, between bone and soft tissue, or between two soft tissue compartments, respectively, is of major importance for a successful surgical resection. Also, an extracompartmental origin of the tumour may be a more favourable biological basis than the extension of an originally intracompartmental tumour beyond the compartment boundary. Therefore, we base our staging on a tripartite instead of a bipartite classification:

T1 Intraosseous tumour.

T2 Tumour close to the compartment boundary. No tumour cell infiltration in the periosteum. No soft tissue extension.

T3 Breakage of the compartment boundary.

In suitable locations, we use vascularized autografts in combined therapy patients, and non-vascularized auto- and allografts in cases when surgery is the only modality. The principles of management of osteosarcoma and Ewing's sarcoma have been defined in the Scandinavian Sarcoma Group.