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### The value of Tc-3-phase scans and In-leucocyte scans in the diagnosis of infections of the musculoskeletal system

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In a prospective study of 60 patients suspected of having an infection of the musculoskeletal system in 1986 and 1987, 65 Tc-3-phase scans and 40 In-leucocyte scans were performed. An analysis was made of the results in 54 patients in whom a definite diagnosis was established. All the scans were evaluated by three of the authors without knowledge of the clinical data.

Most of the infections were various forms of osteomyelitis and arthritis. The sensitivity and specificity of the Tc-3-phase scan were 91 and 75 percent, respectively; the corresponding figures for the In-leucocyte scan were 85 and 80 percent.

*Conclusions:* 1) For scintigraphic diagnosis of infections of the musculoskeletal system, it is sufficient to perform a Tc-3-phase scan. 2) An In-leucocyte scan may be useful if there is continued doubt about an infection, as in the case of chronic osteomyelitis or after bone surgery. 3) In the case of arthritis a Tc-3-scan is useful only if osteomyelitis is to be eliminated. 4) Neither Tc-3-phase nor In-leucocyte scans can differentiate between infection and aseptic inflammation.

### The initial phase of ischemic osteonecrosis and repair

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The clinical, scintigraphic, CT, and histomorphologic findings obtained in a patient with ischemic changes in the proximal tibia and calcaneus as a result of emboli were studied.

The core biopsy specimen from the tibia showed necrosis of the preexistent bone trabeculae associated with extensive appositional and intertrabecular bone remodeling. The specimen from the calcaneus, however, was characterized by viable preexistent trabecular bone with reactive deposits of mature lamellar bone throughout the specimen; intertrabecular tissue was observed only sporadically.

The findings seem to suggest a correlation between histomorphologic changes and the severity of the ischemic episode.

### Use of homologous bone in revision total hip replacement performed for acetabular protrusion

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During revision operations for protrusion, reconstruction of the acetabulum is required. Filling the abnormally deep cup with cement gives only good short-term results. A more stable medial acetabular wall can be achieved with the aid of a bone graft, reinforced by a metal ring if necessary.

In view of the poor mechanical qualities of the autologous iliac bone in these usually older patients and the lack of the autologous femoral head, homologous bone has unmistakable advantages: good quality and availability via the bone bank.

In 23 patients treated by a revision operation for acetabular protrusion, the homologous bone graft settled well. There was no clinical evidence of loosening after a follow-up of 4 months. The Harris hip score (0–100) improved from 29 (5–53) before to 62 (30–82) one year after the operation. One female patient developed a deep infection resulting in a Girdlestone operation. In another patient with adequate settling of the homologous bone graft, a radiolucent line (2.5 mm) around the cup was observed; however, this patient showed no evidence of loosening.

Reducing the stress on the medial side of the acetabulum by lateral placement of the acetabular cup and reinforcement of the medial wall with homologous bone reduces the long-term risk of loosening.

## The bone-loading plate in fractures and osteotomies of the tibia and femur

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In a prospective study, 18 tibial and 6 femoral fractures, and 2 corrective osteotomies of the femur and 2 of the tibia were surgically fixated with the aid of the bone-loading plate. On the second postoperative day, all the patients were allowed mobilization on crutches with increasing weight bearing guided by the amount of pain. Patients with tibial fractures and osteotomies walked with two crutches for 4 weeks and subsequently used one crutch until consolidation. Patients with femoral fractures and osteotomies walked with two crutches for 6 weeks and with one crutch until consolidation.

The mean period of consolidation of the tibial fractures was 14 weeks, whereas that of the femoral fractures was 13 weeks. All the patients showed normalized knee and ankle function 6 weeks after the operation. One patient required a reoperation because of technical problems. One patient developed a superficial infection. No pseudoarthroses were observed.

*Conclusion:* Fixation with the new bone-loading plate was followed by rapid fracture consolidation with ample callus formation, and immediate weight bearing was possible with excellent function of the knee and ankle joints.

## Effects of preparation technique on the porosity of acrylic cement

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The dynamic or fatigue strength of acrylic cement largely depends on its porosity. The effects of various cement preparation techniques were studied: 1) manual mixing, 2) precompression with a compressed air gun (Scientific Development, Munich, FRG), 3) vacuum mixing using a commercially available system (Stryker), and 4) an experimental system in which powder and fluid can be added under a vacuum.

The overall porosity was measured in rods of 26-mm diameter and also in a laboratory model of femoral shaft fixation, using the pycnometer (ASTM 792–66). Pore size and distribution were measured by quantitative microscopy of cross sections. Three different cements were used: high-viscosity Palacos-R, medium-viscosity Palacos-E, and low-viscosity Zimmer LVC.

A mean porosity of 8 percent (Palacos-R and LVC) and 4 percent (Palacos-E) was found after manual mixing. Compression with the compressed air gun and centrifugation had no effect on overall porosity as compared with manually prepared specimens. Moreover, centrifugation led to an uneven distribution of porosities and spin-off of roentgen contrast media. Using the experimental vacuum system, porosity reductions of 80 percent were achieved. The commercial system was slightly less efficient.

Vacuum mixing of cement, preferably combined with an addition of powder and fluid under a vacuum, significantly reduces porosity, and thus enhances dynamic strength of acrylic cement.

## Sarmiento bracing in the treatment of isolated ulnar shaft fractures

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Sarmiento bracing was used in the treatment of 24 isolated ulnar shaft fractures between 1985 and 1987. In all the cases the cause was a direct trauma; all the fractures were uncomplicated, with half of them showing dislocation. Primary treatment was with an upper arm plaster splint, replaced after 1 week by an Orthoplast brace, fitting snugly around the forearm. This brace was worn until consolidation. The follow-up on 23 patients ranged from 4 to 30 months, results being evaluated by the criteria of Altner and Hastmann. The final result was excellent in 19 patients and good in the remaining 4. Rotation was unrestricted in 19 patients and restricted to 10°in 2; supination was restricted to 20°in 2 other patients. No shortening was observed. Some angulation (≤18°) was observed in 9 cases. There was no correlation between angulation and final functional result. Pseudarthrosis or bridge callus formation was not observed.

## Treatment of clubfeet in spina bifida

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In a group of 102 children with spina bifida, 29 had 48 clubfeet; 38 feet of 29 children were treated surgically. The objective in treating clubfeet in spina bifida is 1) nonwalkers should be able to wear normal footwear; 2) walkers need plantigrade, stable, and preferably mobile feet.

A posterior release was performed on 9 feet of 7 children. The age at operation was 2 (1–4) years. The follow-up covered 6.5 (3–14) years. The preoperative objective was achieved in only four feet. A primary bilateral talectomy was performed in 1 case; the deformity recurred.

An extensive posteromedial release was performed on 27 feet of 17 children. The age at operation was 2 (1–9) years. The follow-up covered 9 (1–15) years. The Achilles tendon and the flexor tendons were lengthened (10 feet) or excised (17 feet). Treatment was successful in 18 feet, the remaining nine feet showing recurrences of the deformity.

Permanent correction of clubfoot deformities is best achieved by excising the flexor tendons and their sheaths.