ORAL PRESENTATIONS

ID 66
A new diaphyseal anchorage for tumour prostheses
R. I. Kotz
Medical University of Vienna, Vienna, Austria

Introduction: After 20 years of successful implants of KMFTR and HMRS a global tumour prosthesis system has been evolved in co-operation with American colleagues. The successful cement free, porous coated anchorage fixed with screws to enable a primary stabilisation has had disadvantages in long term observation. Stress shielding occurred or stems were broken due to the holes in the stems.

Material and Methods: Therefore, the main task for the new global system was to develop a cement free, secure rotation stem which would not feature these disadvantages. The teams in Bologna and Vienna both developed preliminary stems in their laboratories, which had slanted fins and would stabilise against rotation of a straight stem in the femur and tibia. The tests showed that during the moment of turning the prosthesis a lifting out occurred. In tumour prostheses in the region of the knee, bending the knee has the effect of a large lever arm, therefore rotation stability is of great importance. Therefore, grooves were developed, which were added parallel and proximally on the stem. However, this made it necessary to develop a special implantation technique.

Results: The new diaphyseal anchorage for the GMRS system is a smooth titanium stem, 12.5 cm in length with a bullet tip. The stem has 3 parts the tip smooth middle part coating of titanium plasma spray and in addition proximal hydroxyapatite. The rotation stabilisers are in the proximal part. Using reamers diaphyses are prepared to the right size and grooves are prepared by using templates and 4 drills.

Conclusions: Due to the precision of the instruments and implants to an exactness of 0.05 mm the press fit is very taut and there is no danger the bone will be split. So far 31 patients have been provided with this stem and till now there have been no cases of rotation instability or loosening.

ID 123
Innovative surgical techniques for proximal tibia reconstruction in young sarcoma patients. 20 years experience
M. Manfrini, L. Campanacci, M. De Paolis, M. Mercuri
Istituto Ortopedico Rizzoli, Bologna, Italy

Introduction: In the last 20 years, reconstructive techniques for child skeleton have dramatically improved. Proximal tibia (PT) represents the second most frequent location for children bone sarcoma and its reconstruction has challenged surgeons to search for innovative solutions. The authors reviewed their experience in children PT reconstruction focusing on new techniques used in the last decade.

Material and Methods: Functional and radiographic evolution was analyzed in a consecutive series of 102 children from 6 to 14 y/o (mean 11 yrs), surgically treated by PT resection and reconstruction for bone sarcomas (86 osteosarcoma, 13 Ewing’s, 3 MIFH) in the period 1982-2005. Surgical reconstructions differed along the years. In the first phase (1982-1993) 25 knee arthrodeses (AR) and 17 modular megaprostheses (MP) played the major role, while before 1994 only 7 PT tumors were removed by an intercalary PT resection through intraepiphyseal osteotomy. Osteoarticular allografts (OA) were used in 12 cases from 1991 to 1997. In the second phase (1994-2005) modular knee MP were used in 8 patients while allograft prosthetic composites were implanted in 19 patients with two technical variants: a rotating hinged knee prosthesis, cemented into a PT allograft with a long uncemented stem in the residual tibia (APC1), was used in 7 patients over age 12, while from 1997, in 12 young children (age 6-12 yrs), osteoarticular reconstruction was obtained by resurfacing a PT allograft with the tibial component of an unconstrained knee prosthesis (APC2). In the same period no AR was performed, while 15 PT tumors were removed through intraepiphyseal osteotomy and reconstructed by massive allografts associated with vascularized fibula autografts (MA/VA).

Results: At mean follow-up of 77 months, 68 patients are alive, but 42 (62%) had further surgery related to the primary implant. In long-term survivors, the percentage of surgical revision was 80% in OA, 75% in MP, 66% in APC1, 50% in AR,
Ankle arthrodesis with bone grafts in tumor surgery

G. Beltrami, R. Capanna
Department of Orthopaedic Oncology CTO CAREGG, Firenze, Italy

Introduction: Ankle arthrodesis is considered a valid reconstructive option after bone tumor resection of the distal tibia, distal fibula and of the talus. The purpose of the present study was the review of author’s experience in ankle arthrodesis for bone tumors with the employ of bone grafts.

Material and Methods: Over the last 15 years, 17 ankle arthrodesis were performed in author’s Institution for oncological pathologies. Twelve patients had a malignant tumor (3 osteosarcoma, 2 liposarcomas, 1 Ewing sarcoma, 1 eamangioperi- dotelomia, 1 condroblastoma, 1 plasmosarcoma, 1 adamantinomia and 2 metastases from renal carcinoma) and 5 patients had a benign tumor (4 giant cell tumors, 1 condroblastoma). In 13 cases the tumor involved the distal tibia, in 2 cases the distal fibula and in 2 cases the talus. In 15 patients we performed a tibiotar arthrodesis and in 2 patients (tumors of the talus) a tibiocalcaneal arthrodesis. Average age at the time of surgery was 41 years (4 - 75). The bone defect after resection of malignant bone tumors and reconstruction of bone sarcomas, 7 osteosarcomas [2 locations in one patient] joint space was calculated in accordance with ISO 14243. A height determined on the glenoid. A mean abrasion rate of 28 mg/106 cycles was calculated in accordance with ISO 14243. A height determined was 5x106 cycles.

Results: Three patients died before this review (1, 1.5, 7 years after surgery: 1 Ewing sarcoma in 1 case and in a giant cell tumor in 1 case. One patient is alive with lung metastases but no signs of local recurrence. In all patients but one the arthrodesis healed successfully. In one case a deep infection occurred (with wound dehiscence) and the arthrodesis did not heal. Complications included 1 deep infection, 1 superficial infection of the donor site (cortical autograft) treated with plaster cast. Three patients underwent a secondary surgical procedure: two partial hardware removals and one mycoscutaneous sural flap.

Conclusions: The low rate of local recurrence (1/5 in benign tumors and 1/12 in malignant tumors) and the high percentage of bone union (16 out of 17) together with the satisfactory functional outcome showed that ankle arthrodesis with bone grafts can be an oncologically safe and a mecanically successful procedure in bone tumor surgery.

ID 23
Investigation regarding the tribological behavior of the new inverse MUTARS® humerus tumorendoprosthesis

G. Gosheger, J. Hentsch, S. Vater, N. Heilmers
1 Institute of Material Research, Dresden, Germany
2 Department of Orthopaedics, Eilbek, Germany

Introduction: For the improvement of the functional results after resection of malignant bone tumors and reconstruction with an endoprosthesis, the Mutars inverse humerus-prosthesis was developed. A significant feature of this prosthesis is a humeral concave titanium-niobium-coated articular surface which articulates against a convex glenosphere of polyethylene. The polyethylene of the glenosphere should serve as a shock absorber and avoid loosening in case of the mostly youthful patients. Tribological investigations were necessary in order to justify the employment of the new prosthesis.

Material and Methods: The investigation was carried out with a test device consisting of a slide table, an oscillating crank, an electromechanical drive and a thermostat. A simulation of the infection, abduction, longitudinal displacement and axial load was implemented. Bovine serum solution, which consists of calf serum and bidistilled water, was employed as a testing medium. The protein content of the solution is 20 g/l (+/-2g/l). The number of cycles implemented was 5x106 cycles.

Results: After the cyclical loading no visible damages could be identified on the surfaces. A mass reduction of 172 mg was determined on the glenoid. A mean abrasion rate of 28 mg/106 cycles was calculated in accordance with ISO 14243. A height determined was 5x106 cycles.

Conclusions: In conclusion, the investigation carried out justifies the clinical use of the new shoulder endoprosthesis.

ID 31
Epiphyseal sparing tumor resections for malignant tumors in growing children

G.U. Exner, C.E. Dumont
Uniklinik Balgrist, Zurich, Switzerland

Introduction: Epiphyseal sparing tumor resections have been performed for the Pampillonia group (Canadall, San Julian) using growth plate (physical) distraction. We have used trans-epiphyseal resections and physical distraction for joint sparing resections in malignant metaphysial malignant tumors.

Material and Methods: In 8 children with open physis (2 Ewing sarcomas, 7 osteosarcomas [2 locations in one patient]) joint sparing resections have been performed either using physical distrac-
tion (2 cases) or transphyseal resections (6 cases) were performed. For reconstruction of the defect allograft interpositions (n = 3), free microvascular fibular transplants (n= 4) and a composite of allograft + fibula (n= 1) were used. 5 distal femoral resections and 4 proximal tibial reconstructions were performed. Age at treatment was between 6 and 18 years, average 11.9 years.

Results: All patients remained free of local recurrence at 0.7 to 8 years t/λ (average 3.3 yrs). Reconstruction failed due to infection at 4 years t/λ in one patient, who had an allograft reconstruction and postoperative irradiation; this was salvaged by shortening of the lower leg. The other reconstructions continue to function well at an average t/λ of 3 yrs. Leg shortening of 6 cm was corrected in the initially 6 yr old patient by callus distraction through its retained bone at the age of 14 years.

Conclusions: In metaphyseal malignant bone tumors in selected patients joint sparing resections can be performed when the tumor is reaching but not crossing the physis. Criteria for defining if the epiphysis is spared from tumor invasion must further be clarified by improved imaging techniques. Thus except shortening due to loss of the physis full biologic recovery with preservation of the joint can be achieved.

ID 113
Total femur prosthetic reconstruction: the Rizzoli Institute experience
D. Bongiorni, G. Bosco, D. Antonioli, M. Mercuri, E. Bertelli
1 Department of Orthopedics, University of Bologna and Istituto Rizzoli, Bologna, Italy
2 Department of Orthopedics of the Pontificia Universidad Catolica de Chile, Santiago, Chile

Introduction: Purpose of this study was to review the Rizzoli experience with total femur prosthetic reconstruction.

Material and Methods: From a series of 896 megaprostheses of the lower limb after treatment for bone tumors treated at the Rizzoli between 1983 and 2004, 25 cases of total femur prosthetic reconstructions performed between September 1987 and June 2004 were studied. There were 15 males and 10 females, ranging in age from 7 to 62 years. Minimum time elapsed from total femur reconstruction was 24 months, with an average of 10 years and a maximum of 18 years. Average oncologic follow up was 66 months (5 - 215 mos.) and the average follow up of prosthetic reconstruction was 32 mos. Total femur prostheses included 4 Kotz type, 20 HMRS prostheses (1 rotating hinge and 1 expandable), 1 CMRS prosthesis. These were 19 primary reconstructions and 6 secondary in revisions of 3 distal femur prostheses, 1 vascularized fibula, 1 intrallesional excision. Histological diagnosis included 15 osteosarcomas, 7 Ewing’s sarcomas, 1 angiosarcoma, 1 chondrosarcoma and 1 Echinococcosis. Surgical margins of the 24 tumors were wide in 23 and wide/contaminated in 1. For soft tissue reinsertion to the prosthesis different techniques were used: polyethylene plate in 5 cases, ETA in 3, Dall Miles in 1, direct reinsertion to the prosthesis and/or suture to the fascia lata in 16 cases. Usually postoperative immobilization in cast was used for 3-4 weeks and a brace for 2 more months. All patients were routinely followed in the outpatient clinic and data were obtained from clinical charts. All imaging studies were reviewed and complications analyzed. Functional results were assessed according to the MSTS functional evaluation system and rated excellent with a function scored over 75% of normal function, good between 51% and 75%, fair between 26% and 50% and poor below 25%.

Results: Oncologic results of 24 tumors showed 11 pts. continuously disease free and NED at an average follow up of 111 months (9 - 215 mos.). 2 pts. AWD at 20 and 32 months respectively, 11 pts. DWD at an average of 24 months (6 - 66 mos.). Complications observed included 1 infection, 3 wound healing problems requiring surgical revision, 3 cases of hip dislocation usually surgically treated initially 1 ETA detachment and 1 trochanteric bone sleeve disinsertion. In 1 pt. a posttraumatic periprosthetic fracture occurred. Functional results were evaluated in 20 cases, while 5 pts. with a prosthesis follow up of less than 6 months were not evaluable. According to the MSTS System results were excellent in 20%, good in 65% and fair in 15% of pts.

Conclusions: Total femur prosthetic reconstruction has selected indications. In the reported series this technique was effective in primary reconstructions as well as in salvage procedures of failed previous reconstructions. Complication rate was relatively low and functional results were satisfactory in most pts.

ID 13
Total femoral replacement – outcomes in oncological patients
S. Kato, A. Akuda, H. Murata, R. Grimer, R. Tillman, S. Carter
Queen Elizabeth Hospital, Birmingham, UK

Introduction: We have assessed the oncological and functional outcomes in patients who have undergone total femoral replacement with a hip and knee replacement after tumor excision.

Material and Methods: Patients with a total femoral replacement were identified from an oncology database.

Results: We identified 36 patients from a tumour database who underwent total femoral replacement either as a primary procedure (19 patients) or following conversion of a distal or proximal femoral replacement (8 patients) or after inadvertent nailing of a pathological fracture subsequently found to be a sarcoma (7 patients). The age range of the patients was from 13 to 84 and the most common diagnosis was osteosarcoma. The median survival for the 10 patients with metastases at diagnosis was 9 months but for those patients with non metastatic sarcomas the survival was 57 at 20 years following the procedure. The most common complication was dislocation of the hip in five patients. Two patients had amputations for local recurrence and infection and three had complete revisions — one for stem breakage, one for recurrent dislocation, one for loosening. The overall survival of the implants without revision of any component was 89% at 10 years and 71% at 20 years. The average functional score was 73%.

Conclusions: Total femoral replacement is a major surgical procedure which fortunately is rarely required. It produces surprisingly good functional results with an acceptable risk of revision.
ID 93
Preoperative irradiation or no irradiation in the local treatment of Ewing sarcoma
M. Hiz, R. Eksioglu, N. Molinas, F. Dincazbas, R. Dhair, B. Yücel
Istanbul University Cerrahpaşa School of Medicine, Department of Orthopaedics, Department of Medical Oncology, Department of Radiation Oncology, Istanbul, Turkey

Introduction: Local wide excision subsequent to induction chemotherapy with or without preoperative irradiation gained popularity in the local control of Ewing’s Sarcoma of bones in the last decade. Surgical removal of the tumor provides not only the local control of the tumor but also prevents the late recurrence that was seen in the patients treated by local irradiation without surgery. The determination of surgical margin is controversial because the soft tissue extension of the tumor shrinks after induction chemotherapy. Preoperative irradiation could be efficient in diminishing rate of local recurrence by sterilizing the reactive zone so that enabling the surgeon to remove less soft tissue with relatively sufficient tumor control.

Material and Methods: 20 patients with Ewing’s Sarcoma 10 females, 28 males with a mean age of 19.7 (4 to 55) were treated in our institution by chemotherapy and local wide excision in last 15 years. 17 of these patients received preoperative radiation. Reconstruction was obtained by endoprostheses in 12, composite prosthesis in 3, allograft in 13 patients, 10 patients received resection only: 10 patients were operated by the single surgeon. Chemotherapy protocol was a modification of VACA with addition of ifosphamide and etoposide. Mean follow up was 34.7 months (12-98).

Results: 23 patients were NED, 2 were AWD (lung metastasis) and 13 patients were DOD in mean 34 months followup. Overall survival rate was 62.7 percent, estimated 5 years survival according to Kaplan-Mayer. Event free survival was 50% (10/17 patients) in preoperative irradiation group and it was slightly better 61% (13/21 patients) in the patients who received chemotherapy before the operation. Regarding complications: Local recurrence was 5.8 percent (1/17) in preoperatively irradiated patients, 9.6 percent (2/21) in the patients received chemotherapy before the operation. Infection rate was 23.5 percent (4/17) and 5.8 percent (1/17), delayed wound healing was 52.9 percent (9/17) and 14.3 percent (3/21) in both groups respectively. Regarding distant metastases; local recurrence was lower than the chemotherapy and systemic therapy. Eventhough the rate of local complications such as infection which resulted in loss of all graft in 2 of 4 infected cases in the preoperatively irradiated patients; local recurrence was lower than the chemotherapy and surgery group in these relatively less sensitive tumors to the systemic therapy. Event free survival and other complications were similar in both groups. In conclusion response to the induction chemotherapy proposes the need of external irradiation. Perioperative infection prophylaxis and meticu-

ID 76
Reconstruction following segmental diaphyseal resection of lower limb malignant bone tumours in children
D.J. Briq, S. Passier, J. Michon, C. Gliron
University Teaching Hospital Necker, AP-HP, Paris V, Paris, France

Introduction: Reconstruction of long bones diaphysis in the lower limb yields specific issues in children. Long lasting reconstruction and preservation of the potential for growth are necessary. We present 14 reconstructions of the diaphysis of femurs and tibias with autologous bone grafting.

Material and Methods: Fourteen children with a mean age of 11 (range 7-16) had resection for a primary malignant bone tumour. There were 8 osteosarcomas and 6 Ewing sarcomas. All patients had preoperative chemotherapy and 2 had adjuvant radiotherapy. The median length of resection was 16 cm (range 11 to 26). Mechanical reconstruction was done using a plate in 4 cases, a nail in 6, an external fixator in 1 and mixed devices in 3. Biologic reconstruction (osseous) was done using strut and corticocancellous autografts in 11 patients, a free vascularised fibular autograft in 2 and a bone transport in 1. Two patients had delayed bone grafting based on the principle of the induced membrane.

Results: The median follow-up was 66 months (range 12 to 209). At last review, all patients were alive. All patients required one or more reoperations to treat mechanical or infectious complications; the median number of reoperations was 2 (range 1 to 15). Secondary bone grafting was necessary in 10 patients. Bone consolidation was obtained in all patients. The median time to free full weight bearing was 9 months (range 1 to 24).

Conclusions: Reconstruction of diaphyseal resection of long bones in the lower limb in children can be obtained through very different procedures. However, each of these procedures needs some technical experience in order to minimise complications. As secondary corticocancellous bone grafting is very likely, we propose a two-stage reconstruction with delayed corticocancellous bone grafting based on the principle of the induced membrane which appears to be an interesting procedure.

ID 170
Reconstructive surgery in bone and soft tissue tumours of extremities
V.G. Serinyan, G.H. Gulzianyan, A.S. Serinyan
V.A. Fanarjyan National Oncology Center, Ministry of Health, Yerevan, Republic of Armenia

The use of plastic and reconstructive surgery makes an opportunity preservation of extremity with malignant bone/joint and soft tissue tumor. The large involvement of muscles, bones, maqistral vessels and nerves usually was before an absolute indication for amputative surgery. The trends in reconstructive surgery makes possible carrying out an extensi-
ve wide excision of tumor and all involved tissues with subsequent reconstruction of created tissue defects. It is now possible to combine different methods of plastic (bone/joint and skin/soft tissue plasty). 626 patients with bone and soft tissue tumors were operated in the Republic Center of Bone Pathology (Republic of Armenia) during the period since 1998 to 2006. In 426 cases different methods of bone and soft tissue plasty was applied (using auto-, allografts and different types of implants). All the types of bone and soft tissue plasty are compatible with other components of chemo- and radiotherapy. The research of remote clinical results demonstrate that wide resections with subsequent reconstruction of tissue defects increase 3-year recurrence-free rate both in bone and soft tissue sarcoma. The same approach is applicable in locally invasive tumors (lytic form of giant cell tumors of bones, aggressive neurofibromatosis, etc.). Complications rate was very low (approximately 2%), and usually complications occurred where inadequate surgery in general clinic was performed, often under local anesthesia, which is contraindicated in treatment of this contingent of patients. The main criteria of preservation is a functional status of the operated extremity. In our opinion the use of plastic and reconstructive surgery enables to increase the arsenal of surgical method in treatment of tumors of locomotor apparatus. We consider that all patients with tumors of bones and soft tissues should be treated only in specialized oncolgic clinics where adequate combined and complex treatment according to existing protocols of treatment may be carried out.

ID 242
Indication for surgical treatment of metastatic lesions of spine
M. Aliev, E. Musaev, E. Sushentsov, A. Vuliev
N. N. Blokhin Russian Cancer Research Center, Moscow, Russian Federation

Introduction: Metastatic lesions of the skeleton are found in 50 - 70% of patients who died from malignant tumors, of which 40% of metastases localize in the spine. From 5 to 10% of all cancer patients suffer from compression of the spinal cord. The purpose was to determine the indications for surgical treatment of the spinal metastatic tumors.

Material and Methods: From 1995 to 2003, in the General Oncology department, 70 patients underwent surgery for metastatic involvement of the spine. The mean age of patients was 53.9 years (ranged from 34 to 69), 41 patients were male and 29 — female. The most frequent source of metastases to vertebral column were renal cancer — in 19 cases, breast cancer — in 10, lung cancer — in 8, from unknown primary origin — in 7, prostate cancer — in 5, and colorectal cancer, bone sarcomas, lymphomas and myelomas and etc. — in 21 patients. The level of vertebral column involvement was as follows: cervical spine — in 2 patients, thoracic spine — in 39, lumbar spine — in 26 and sacral spine — in 3 patients. All patients complained of pain syndrome and/or neurological deficit. Before treatment all patients were evaluated by special scales: Watkins Scale, VAS, Frankel Scale. We also used Tomita Scale and Tomita Prognostic System in choosing surgical tactic.

Results: Only decompound surgery was performed to 47 patients, with fusion — to 23 patients. Moderate decrease of pain syndrome was seen in 40% patients. Regression of neurological deficit occurred in 30%, and quality of life improved in 70% patients. The most often complication was intraoperative bleeding especially in renal cancer metastases; infectious complications occurred in 4 patients (in 2 cases — meningitis and in 2 — deep wound infection of transpedicular spinal device). In the postoperative period, neurological deterioration happened in 2 cases which then improved, 2 patients died intraoperatively.

Conclusions: treatment of patients with metastatic lesions of the spine is multidisciplinary problem demanding the complex approach to determining the tactic of surgical treatment.

ID 52
The RPS System in metastatic lesions of the proximal femur
V. Ippolito, L. Iann, M. Saccalani
Orthopedic Oncology, Civil General Hospital, Brescia, Italy

Introduction: The proximal femur is, among all sites for bone metastases, one of those most often requiring a surgical treatment. This is because it is frequently involved early in the metastatic stage, when the performance-status of the patient is still very good and the pain provoked by a lytic lesion or a pathologic fracture and the functional disability associated can severely jeopardize the patient’s quality of life. Considering the increased life-expectancy of metastatic breast cancer, the diffuse medical-awareness of general population and the increasing request for effective palliative treatment, the number of potential candidates is very high. Resection and modular prostheses is the most adequate option for most of these patients but the high cost of the systems used for primary tumors would make it impractical and financially disruptive for any institution to use them for metastatic patients. It is therefore important to have available a system combining the ability to fulfil the requirements of those patients at a cost which our administrations can accept.

Material and Methods: We started using the RPS modular system in 1982 and, through December 2003, we have made 120 implants including: metastatic lesions (91%), salvage procedures for non-tumor patients in poor medical condition (6%) and primary tumors in patients with advanced disease and a short life-expectancy (3%).

Results: Prostheses survival was 97%; only 30% of the patients were alive 18 months after surgery but 15% are still alive after 8 years.

Conclusions: With its features combining adequate mechanical characteristics, easy and quick surgical technique (surgical time ranges 45-90 minutes), low complication rate and a cost which is lower than the more complex systems used for primary tumors, the RPS system has demonstrated to be the best option for these patients.

ID 94
The use of massive endoprosthesis for the treatment of bone metastases
Royal National Orthopaedic Hospital, Stanmore, Stanmore, UK

Introduction: We report a series of 58 patients with metastatic bone disease treated with resection and endoprosthetic...
reconstruction over a 5 year period at our institution. The recent advances in adjuvant and neoadjuvant therapy in cancer treatment has resulted in improved prognosis of patients with bone metastases. Most patients who have either an actual or impending pathological fracture should have operative stabilization or reconstruction. Endoprosthetic reconstructions are indicated in patients with extensive bone loss, failed conventional reconstructions, and selected isolated metastases.

Material and Methods: We identified all patients who were diagnosed with metastatic disease to bone between 1999 to 2003. A review of all histological reports in this period was carried out to identify these patients.

Results: 171 patients were diagnosed with bone metastases. Metastatic breast and renal cancer accounted for 47% of the lesions. 38 patients with isolated bone metastases to the appendicular skeleton had an endoprosthetic reconstruction. There were 28 males and 30 females. 11 patients had lesions in the upper extremity and 47 patients had lesions in the lower extremity. The mean age at presentation was 62 years (range 24 to 88). At the time of writing, 19 patients were still alive, 34 patients had died and 5 were lost to follow-up. Patients were followed up and evaluated using the Musculoskeletal Tumor Society Tumour Score (MSTS) and the Toronto Extremity Salvage Score. The mean MSTS was 73% and TESS was 71%. Mean follow-up was 54.6 months (range 24 to 78). Complications included 6 wound infections, 1 aseptic loosening, 6 dislocations, 1 subluxation, and 1 prosthesis rotated requiring open repositioning.

Conclusions: We conclude that endoprosthetic replacement for the treatment of isolated bone metastases can be a useful alternative reconstruction in selected cases and achieves the aims of restoring function, allowing early weight bearing and alleviating pain.

ID 241

Different reconstructive methods in musculoskeletal oncology

V. Sobolevsky, Yu. Egoryov, K. Kropotov, M. Aliiev
N.N. Blokhin Russian Cancer Research Center, Moscow, Russian Federation

Introduction: Currently there are a lot of various reconstructive techniques for defects after resection of locally advanced musculoskeletal tumors. There is no consensus about the most appropriate reconstructive method in each individual case. In this study we defined our strategy in using of two main methods: local flap transfer or free flaps reconstruction.

Material and Methods: Our strategy based on individualized approach. The choice of reconstructive method depends on size of defect, localization, components of tissue to be reconstructed, functional and cosmetic aspects. Short term functional and cosmetic results and the complication rate were analyzed.

Results: Since 1998 168 patients with local advanced tumors were operated. In 90 patients we used regional flap transfer (Group 1). More often we used muscular and musculocutaneous flaps (68). In proximal femur tumor the standard method was recto-abdominal flap transfer. For reconstruction of extensive tissue defect in shoulder TDL flap was routinely used. The transfer of pedicled fibula was performed in 5 patients with large diaphyseal tibia defects. In 17 patients we used combined bone-muscle-cutaneous flap transfer mainly for mandible reconstruction. These flaps consist of pectoralis major muscle with rib or trapezius muscle with spine scapula. In 78 cases (Group 2) we used free microvascular flap for defect reconstruction. There were 21 bone transplants, 35 muscle-cutaneous flaps and 22 combined bone-muscle-cutaneous flaps. We choose microvascular methods in case when local transfer is impossible or will not provide good functional and cosmetic results. Good functional and cosmetic results were obtained in 157 patients (92%). In the Group 1, there were 6 marginal skin necrosis which were managed conservatively. In Group 2 we observed 3 patients with flap necrosis. Repeated surgical procedures were performed in these cases.

Conclusions: Using of individualized approaches to choose the optimal reconstructive method allows to achieve good functional and cosmetic results with low rate of postoperative complication.

ID 120

Pelvic endoprostheses – biomechanical aspects and surgical technique

Z.A. Motyjevsky, Z. Matejovsky
Orthopedic clinic Balvinka, Prague, Czech Republic

Introduction: Large periacetabular tumor resections remain a challenge for a stable pelvic circle reconstruction with an endoprosthesis. This requires a technically and biomechanically good model.

Material and Methods: We refer our first two patients with a short term follow up after implantation of a custom made pelvic endoprosthesis Beznoska. Fifteen year old boy with pelvic osteosarcoma involving region I-III after a transsacral resection in 7/01 an endoprosthesis, fixed to the sacrum and short parts of pubic and ischial bones, was implanted in 4/03. Fifty seven year old man with a pelvic chondrosarcoma in region I-III received an endoprosthesis fixed to the remaining iliac wing and short parts of pubic and ischial bones in 11/04.

Results: Both models consisted of multiple parts that enabled a relatively easy component fixation to pelvis and only a slightly difficult assembling by gradual tightening of the screws. Both patients were ambulatory with two crutches from day 10 after surgery. One year after surgery they walked with one below arm crutch. First patient had a peroneal paresis after initial surgery which altered his gait. He also had repeated aseptic fluid accumulation around the endoprosthesis due to muscle irritation. Nevertheless, the sacral screws didn’t fracture even with signs of aseptic loosening towards the sacrum. The second patient is without problems one year after surgery.

Conclusions: Stress-loading of the pelvic endoprostheses must be directed to the lower part of the sacralic joint especially when it is fixed directly to the sacrum, where it must be oblique in the frontal plane. The endoprosthesis must show some elasticity to enable “axial” loading to the sacrum and pelvic circle. The material must be smooth in order to prevent aseptic fluid production. The pelvic endoprosthesis should consist of several components to enable easy implantation, firm fixation and adequate load transfer to the adjacent bone.
ID 114
Desarthrodesis and prosthetic reconstruction of the knee after bone tumors resection: long term results
P. Baggiro, G. Busco, D. Donati, M. Mercari, E. Botello
1 Department of Orthopedics, University of Bologna and Institut Rizzoli, Bologna, Italy
2 Department of Orthopedics of the Pontificia Universidad Catolica de Chile, Santiago, Chile

Introduction: Purpose of this study was to review the Rizzoli experience with prosthetic reconstruction of the knee as a salvage procedure of failed arthrodesis performed after resection of bone tumors.

Material and Methods: Fifteen patients were operated of desarthrodesis and knee megaprosthesis at the Rizzoli between December 1983 and October 1995. There were 7 males and 6 females, ranging in age from 13 to 36 years. In all cases a resection of a malignant bone tumor of the distal femur had been previously performed and reconstruction obtained with a knee arthrodesis using Kuntscher rod and cement. Histological diagnosis was grade osteosarcoma in 12 cases, low grade parosteal osteosarcoma in 1, malignant fibrous histiocytoma in 2. Surgical margins of resection were wide in 11 cases, wide/contaminated in 1, marginal in 2 and intralesional in 1. Causes of revision and desarthrodesis were breakage of the rod in 10 cases and infection in 5 cases. Knee megaprotheses implanted were 13 Kotz 1 type and 2 HMRS. Time elapsed from first surgery to desarthrodesis ranged from 6 to 124 mos (average 46 months). Minimum time elapsed from desarthrodesis and prosthetic reconstruction was 10 years, with an average of 18.5 years and a maximum of 22.5 years. Average oncologic follow up was 19 years (1.5 - 23 yrs) and the average follow up of prosthetic reconstruction was 14 years. All patients were routinely followed in the outpatient clinic and data were obtained from clinical charts. All imaging studies were reviewed and complications analyzed. Functional results were assessed according to the MSTS functional evaluation system and rated excellent with a function scored over 75% of normal function, good between 51% and 75%, fair between 26% and 50% and poor below 25%.

Results: Oncologic results showed 12 pts. continuously disease free and NED at an average follow up of 20 years (204 - 288 mos), 3 pts. DWD at 21, 191 and 239 months respective-ly (in these 3 pts. margins were intralesional, marginal and wide respectively). Complications observed included 4 infections (3 had a previous infection of the arthrodesis), 1 femoral stem loosening, 2 tibial component loosening, 1 breakage of the tibial joint hinge. Four pts. had revision for wear of polyethylene components (2 pts. had 2 revisions). Functional results were evaluated in all 15 cases according to the MSTS system and were excellent in 40%, good in 33%, and fair in 27% of the pts.

Conclusions: Desarthrodesis and prosthetic reconstruction of the knee has selected indications. This technique achieved satisfactory results in most cases although the time elapsed from first surgery could certainly negatively affect muscle function and strength. The posterior hinge of the prosthetic knee joint allows stabilization in hyperextension with minimum muscle strength.

POSTER SESSION

1. Causes of revision and desarthrodesis were breakage of the rod in 10 cases and infection in 5 cases.

2. Knee megaprotheses implanted were 13 Kotz 1 type and 2 HMRS.

3. Time elapsed from first surgery to desarthrodesis ranged from 6 to 124 mos (average 46 months).

4. Minimum time elapsed from desarthrodesis and prosthetic reconstruction was 10 years, with an average of 18.5 years and a maximum of 22.5 years.

5. Average oncologic follow up was 19 years (1.5 - 23 yrs) and the average follow up of prosthetic reconstruction was 14 years.

6. All patients were routinely followed in the outpatient clinic and data were obtained from clinical charts. All imaging studies were reviewed and complications analyzed. Functional results were assessed according to the MSTS functional evaluation system and rated excellent with a function scored over 75% of normal function, good between 51% and 75%, fair between 26% and 50% and poor below 25%.

7. Oncologic results showed 12 pts. continuously disease free and NED at an average follow up of 20 years (204 - 288 mos), 3 pts. DWD at 21, 191 and 239 months respectively (in these 3 pts. margins were intralesional, marginal and wide respectively). Complications observed included 4 infections (3 had a previous infection of the arthrodesis), 1 femoral stem loosening, 2 tibial component loosening, 1 breakage of the tibial joint hinge. Four pts. had revision for wear of polyethylene components (2 pts. had 2 revisions). Functional results were evaluated in all 15 cases according to the MSTS system and were excellent in 40%, good in 33%, and fair in 27% of the pts.

8. Conclusions: Desarthrodesis and prosthetic reconstruction of the knee has selected indications. This technique achieved satisfactory results in most cases although the time elapsed from first surgery could certainly negatively affect muscle function and strength. The posterior hinge of the prosthetic knee joint allows stabilization in hyperextension with minimum muscle strength.

ID 212
Organ-preservation treatment of bone sarcomas
A. N. Aminzaslanov, A.A. Aminzaslanov, E.E. Ibragimov,
A.V. Kuznetsov
Azerbaijan Medical University, Baku, Azerbaijan

Background: Organ-preserving treatment was proven efficient in patients with bone sarcomas. Patients with osteogenic sarcoma, malignant fibrous histiocytoma and poorly-differentiated chondrosarcoma (n=108) received multi-modality treatment, the remaining patients (n=49) were given surgery alone.

Results: Of the patients receiving joint implant 7 (5.4%) developed prostatic complications, 2 (1.3%) had hematomas, 6 (3.8%) implant pedicle fracture and other orthopedic events, 8 (5.1%) developed local recurrence. Support ability of the lower extremity was restored in all cases. 90% of patients could move without support.

Conclusions: The 3-year survival in the total patient group was 90.1±2.1%, i.e. higher than after mutilating surgery (42.2±4.2%).

ID 86
Outcome after extraarticular tumour resection of the knee
C. Gerber, J. Harden, B. Leidinger, H. Ahrens,
A. Streithofer, W. Winkelmann, H. Gashgayer
University Hospital Muenster, Muenster, Germany

Introduction: Suspicion of an intraarticular tumour involvement necessitates to an extraarticular tumour resection. Therefore the resulting bone and soft tissue defect is more extensive in comparison to intraarticular resection. The aim of this study was to examine the complication rate and functional outcome after wide tumour resection and reconstruction with a MUTARS® tumour endoprosthesis.

Material and Methods: In this retrospective study 145 patients (67 female, 78 male) underwent knee resection with a MUTARS® prosthesis after resection of a primary bone or soft tissue sarcoma (osteosarcoma 99, Ewing’s sarcoma 13, chondrosarcoma 10, perosteal osteosarcoma 5, MFH 13, other 5). The tumour was located in the distal femur in 103 cases and in the proximal tibia in 42 cases. An extraarticular resection was done in 18 cases because of radiographically suspected intraarticular tumour extension. The mean follow-up
The application of total femoral replacement in oncological orthopaedics – preliminary report

J. Nazar, A. Nowakowski, J. Markuszewski
Dept. of Orthopaedic Surgery, Poznan, Poland

Introduction: Indications for implantation of prostheses including 2 adjacent joints are currently very narrow and include tumours affecting more than 2/3 of a long bone, multi-focal tumours and to a lesser extent revision procedures in cases of massive bone destruction. The purpose of this study was to review the authors experience in prosthetic reconstruction of the lower limb.

Material and Methods: The authors present the outcomes of 7 patients treated at the W. Dega Hospital in 2004-2006. All patients underwent total femoral replacement due to the neoplastic disease. Indications comprised: 5 cases of osteosarcoma, 1 Ewing’s sarcoma and 1 case of aseptic loosening of the primary hip endoprosthesis with periarticular fracture. In 6 cases the hip joint, femur and knee joint were removed, in 1 case additionally resection of the tibia was performed. 4 Finn, 2 OSS and 1 Mutars endoprostheses were implanted.

Results: In 1 case deep venous thrombosis appeared 4 weeks postop. Response to vascular therapy was swift, no symptoms were noted after 2 weeks. All patients are currently at outpatient follow-up without any local or distant complications. Conclusions: Although technically demanding and requiring adequate experience of the surgeon, megaprostheses are an efficient limb sparing procedure. In neoplastic disease with massive bone involvement this procedure allows for restoration of segmental skeletal defects and return to normal limb function. In revision procedures indications for megaprostheses implantation are mainly massive bone destruction without possibility of standard revision procedure. In authors opinion megaprostheses are very effective method of tumour treatment, which allow limb salvage and excellent functional outcomes in the majority of patients.

Conclusions: Extraarticular resection of the knee joint with en bloc resection arthrectomy by splitting the patella is an oncological safe procedure. However, complications are more frequent than in the case of intraarticular resection. In the case of infection there is a high rate of secondary amputation.

Material and Methods: We looked at an oncological database to identify patients over the age of 80 who had an endoprosthetic replacement after tumour excision. This was supplemented with referral back to the original patient records.

Results: 17 patients over the age of 80 had an endoprosthetic replacement after the past 10 years. The main indication was for metastatic disease (9 patients) but 6 had primary malignant bone tumours. The most common site was the distal femur in 9 followed by the proximal femur in 5. Most of the patients had associated co-morbidity (12 were ASA 2 or 3). There were no perioperative deaths but 2 patients had early complications with one having a paralytic ileus and one a chest infection. The median survival of the patients was 2 years with death being due to progressive metastases in most. 3 had late complications to do with the prosthesis including one infection in a proximal tibial replacement and a late dislocation at 2 years in a proximal femoral replacement. Two patients developed local recurrence treated by local excision and radiotherapy.

Conclusions: Endoprosthetic replacements have a useful role to play in the surgical management of elderly patients. Although they have significant comorbidity most do well. Functional results are less good than in the younger population but most patients regain their independence and are free of pain.

ID 14

Endoprosthetic replacements in the ‘older old’

S. Kaing, R. Grimer, S. Carter
Queen Elizabeth Hospital, Birmingham, UK

Introduction: The population of the UK is getting older. Patients over the age of 80 (the older old) are increasingly presenting with musculoskeletal tumours that require major surgery. We have investigated the success or otherwise of endoprosthetic replacements in this population.

Material and Methods: We have investigated the success or otherwise of endoprosthetic replacements in this population.

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ID 132

Total hip arthroplasty after previous pelvic radiotherapy

V. Varnindh, A. Abada, R.J. Grimer, S.R. Carter, R.W. Tullman
Royal Orthopaedic Hospital, Birmingham, UK

Introduction: 43 patients who underwent primary total hip replacement after previous radiotherapy were studied to determine the risks of complications and implant survival after surgery.

Material and Methods: A retrospective review of operation notes, casenotes and in house oncology patient database with survival status cross referenced with patient’s GP records.

Results: There were 28 males and 15 females. The mean age at the time of surgery was 59 years (16 to 84). Follow-up from the time of surgery to death or last review ranged from 2 to
12 months (mean 35 months). Time from previous radiother-apy to surgery was less than 12 months in 23 patients, 12-24 months in 16 and >24 months in 4 patients. The indication for radiotherapy was malignant disease in all the patients but 11 patients had osteonecrosis with no viable tumour at the time of surgery while 32 patients had residual malignancy. If the patients but one had cemented prostheses associated Libad with acetabular reinforcement in 14 and long stems in 8 pa-tients. There was no in hospital mortality. Complications are frequent particularly delayed wound healing, superficial infection and chronic pain occurring in 28%, 19%, and 26%, respectively. Deep sepsis occurred in 2%, and dislocation in 7%. Cumulative survival of patients after surgery was 57% at 5 years. Cumulative survival of implant taking loosening as end point was 79%, at 5 years. The 5-year implant survival was not statistically influenced by presence of concomitant ace-tubular disease (71% and 82%, respectively), use of long or standard femoral stems (64% and 83%, respectively) and whether residual tumour was present or not 78% and 80%, respectively). Time elapsed between radiotherapy and sur-gery did not influence implant survival.

Conclusions: We conclude that total hip arthroplasty in pa-tients with previous history of radiotherapy is fraught with sig-nificant risks of complications and failure.

ID 260
Hip joint stability in massive proximal femur endoprosthetic replacement
T.P. Kormas, N. Koutselinis, E. Giannakopoulos, I. Galkoumaki, D. Lekkas
St. Savvas Hospital, Athens, Greece

Introduction: We studied a complex technique used to res-tore the muscles and the function in proximal femur recon-structive surgery and its impact in hip joint stability.

Material and Methods: Twelve patients had proximal femur excision and reconstruction with massive endoprosthesis. A modified Hardinge’s surgical approach or Smith-Petersen was used. Hip abductors were detached from their insertion on greater trochanter and proximal femur was excised alto-gether with a muscle cuff within oncological safe surgical margins; some muscles were detached from their insertion points. The femoral component of the prosthesis was posi-tioned in neutral rotation, the acetabulum cup in increased anteversion and hip stability was checked. The gluteus medius was reattached on fascia lata, by the insertion of tensor fasciae latae with strong sutures.

Results: Hip joint was stable in all cases. Partial weight-bea-ring was permitted in a week if the patient had grade II hip abduction and good control of hip rotation; full weight bea-ring was permitted after scar tissue was developed, in about six weeks. There was no dislocation or clinical signs of hip joint instability.

Conclusions: Proximal femur excision and reconstruction with a massive endoprosthesis may lead to hip joint insta-bility and dislocation due to detachment and excision of large muscle masses. Complex reconstruction of the remaining muscles aims in scar tissue formation, which holds the prosthesis firmly in its position. The surgeon shoul select an endoprosthesis of the proper dimensions in order to resist longitudinal traction; the femoral compo-nent should be placed in neutral rotation to stabilize the hip and avoid dislocation.

ID 12
Difficult situations in limb-salvage for primary bone malignancy
S.P. Koch
Dakahlia, Egypt

Limb-salvage for bone malignancy became almost the stan-dard policy in most of the cases. The criteria of success of the strategy of preserving a functional limb in a living patient depends on many factors. The tools of early perfect diagno-sis and identification of the prognostic factors are progress-ing. Adjunct and neoadjuvant therapy are more promising with new drugs and different modalities of administration.

Surgical techniques and improved modalities of reconstruc-tion, whether metallurgic or biological are also solid pillars for the improved oncological and functional results. Still, in some situations, which is not uncommon, we are faced with problems which can affect the selection of the method of reconstruction modalities or even the outcome of limb-salva ge concept. Late presentation, complicated cases, involve-ment of neurovascular bundle, unavailability of the proper reconstructive modalities are some of such problems.

Though the last 15 years we came across a large number of such cases which are managed in the surgical orthopedic oncology unit, Mansourea University hospital, Egypt, the so-lutions we offer for such cases were conditioned by the pos-sible calculated safety outcome. Temporary reconstruction using bone cement model intraoperatively proved to be effective in many situations. Concomitant vascular graft for excised main vessel, in limb-salvage is another solution. Extra corporeal irradiation and reimplantation of the excised segment with certain procedures to augment vascularity and assure taking of the implanted segment with the host bone gave encouraging results.

ID 17
The complete extralesional removal of the ankle joint for a malignant synovial tumor
C.U. Exngy, C.E. Dumont
Uniklinik Balgrist, Zurich, Switzerland

Introduction: The patient presented with a synovial process of the ankle joint which had been biopsied elsewhere. The pathologic examination of a large incisional biopsy showed the newly recognized entity of an acral myxoinflammatory fibroblastic sarcoma (inflammatory myxohyaline tumor of the lower extremities with vireocytes and Reed-Sternberg similar cells), which according to the literature behaves locally ag-gressive and has the potential to metastasise and thus is con-sidered a malignant neoplasia. So far the diagnosis always depends on many factors. The tools of early perfect diagno-sis and identification of the prognostic factors are progress-ing. Adjunct and neoadjuvant therapy are more promising with new drugs and different modalities of administration.

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Prophylactic intramedullary nailing for monostotic fibrous dysplasia: mid-term results in 10 cases

Demiriray Ruhu, Osetslan Taze, Yusufan Ersi, Orhun Ayro, Elier Kosis, Alhamaak Mehm
Gülnane Military Medical Academy, Ankara, Turkey

Introduction: In the present study, 7 cases with monostotic fibrous dysplasia who have functional pain, active lesions (evaluated by radio-nuclear bone scanning) and pathologic fractures risk, were treated by intramedullary nailing. We aimed prophylaxis for pathological fractures and relief of functional pain.

Material and Methods: Four of the cases had lesion in femoral diaphysis, two cases had lesion in humeral diaphysis, and the other one cases had lesion in tibial diaphysis. 5 of the cases were male and 2 of them were female with age mean of 24 (19-30) years. Mean follow-up period was 22 (18-32) months. All cases were treated with unreamed intramedullary nailing which can be inflated.

Results: We had good clinical results in all patients. We evaluated functional pain in accordance with visual analogue scale and relief of pain was clearly noticed at the end of two years. There was no radiological progression in lesions. Except one case, none of them had pathological fracture. One case who had a nondisplace femoral fracture because of traffic accident, was treated conservatively. There was only acceptable nail bending in that case.

Conclusions: In the present study, we reviewed the usage of reamed intramedullary nailing in patients with fibrous dysplasia who have functional pain and pathological fracture risk. Our prophylactic nailing relieved functional pain, reduced the risk of fracture or prevented comminuted fractures during a trauma.

ID 169
Surgical treatment of pathologic fractures of long bones in primary and metastatic bone tumors
S.G. Seinyan, G.H. Galstyan, A.S. Seinyan
V.A. Fanaryan National Oncology Center, Ministry of Health, Yerevan, Republic of Armenia

Recently great attention is given in contemporary literature to bone metastatic involvement complicated by pathologic fracture. If ensuing adjuvant therapy is required, fixation of the fracture will help oncologic management of the patient. There are so-called “bone-seeking tumors” (cancer of the breast, lung, kidney, prostate, thyroid gland etc). Careful examination of these contingent of patients will help to operate them before fracture takes place. This approach will improve the oncologic prognosis and functional results of treatment. Treatment of pathologic fracture is specific depending on primary tumor and it’s localization, involvement of visceral organs, individual prognosis of the disease, biologic peculiarities of the neoplastic process. Occurrence of the pathologic fracture makes impossible the conduction of the specific oncologic treatment. In our opinion, the approach to these patients should be individual. If patient’s general condition is satisfactory, orthopedic fixation or bone replacement should be performed. This approach makes possible early mobilizing patient and allows conduction of the specific anti-tumor treatment in comfortable conditions.

75 patients with pathologic fractures of long bones were operated in the Republic Center of Bone Pathology (Republic of Armenia) during the period since 1998 to 2006. According to the Karnofsky scale patients’ score rised from 30-40 to 70-80 (mean 62,3). In primary bone tumors occurrence of pathologic fractures usually is an absolute indication to ablative surgery. But in our opinion there are some chemosensitive tumors (Ewing sarcoma and reticulosarcoma) where significant effect of neoadjuvant treatment may justify the performance of limb-saving operation in case of minimal initial displacement and complete resorption of soft tissue component.
Introduction: The distal tibia is an uncommon site for primary malignant bone tumours and the treatment of choice for most patients is a below knee amputation. Patients who decline an amputation may be offered an endoprosthetic replacement.

Material and Methods: We report the clinical and functional outcome of limb salvage surgery and endoprosthetic reconstruction of the distal tibia and ankle joint in 5 patients. Over 25 years at our centre, 5 patients underwent distal tibial replacements.

Results: Two had osteosarcoma, one had a recurrence of Ewing’s sarcoma, one had malignant fibrous histiocytoma, and one had adamantinoma. The mean age was 37 years (range from 13 to 69 years). There were no tumour recurrences. Four patients developed complications with wound infection. Two of these resulted in below knee amputations. Average follow-up was 31.2 months with 1 patient lost to follow-up. Patients were evaluated using the Toronto Extremity Salvage Score (TESS) and the Musculoskeletal Tumour Society (MSTS) score. Patients who underwent a distal tibia replacement averaged a TESS score of 88.5% and an MSTS score of 88%, Patients who later had a below knee amputation and who were using a prosthesis averaged a TESS score of 89.3% and an MSTS score of 89.3%.

Conclusions: For those patients who are unwilling to undergo an amputation for malignant tumours of the distal tibia, endoprosthetic reconstruction is an alternative, but at the cost of increased risk of significant complications, functional deterioration and morbidity. There was little difference between functional scores for patients who proceeded to have a below knee amputation compared to patients who still had their endoprosthesis.

ID 246

Limb sparing treatment in tumors of proximal femur
Central Institute of Traumatology and Orthopaedics (CITO), Moscow, Russian Federation

Introduction: Efficacy of salvage operations is based upon the use of modern medical technologies which enable to decrease the risk of complications and improve treatment results. Purpose of study—to evaluate the efficacy of proximal femur tumors treatment using modular MATI-CITO hip endoprosthesis, arterial embolization, intra/postoperative blood reinfusion.

Material and Methods: Limb sparing operations were performed in 48 patients (17 – 74 years) with malignant tumors of the proximal femur. Modular MATI-CITO prosthesis was used. Angiographic examination and selective arterial embolization with Gianturco coils and polyvinylalcohol granules was performed preoperatively. Intraoperatively blood reinfusion and postoperatively reinfusion of drainage blood was performed. Follow up was from 4 months to 6 years.

Results: At arterial embolization it was possible to achieve subtotal and total reduction of pathological arterial blood flow in the majority of cases. Subsequent operations showed the interrelation between the blood flow reduction within the tumor and intraoperative blood loss. Arterial embolization enabled to decrease the risk of intensive hemorrhage and 1.5-2 times diminish the volume of blood loss. During manipulation no complications developed. Intraoperative and postoperative reinfusion enabled to avoid massive blood loss as well as to decrease the volume of homotransfusion in the absolute majority of cases. Clinical results by ISOLS were excellent (20.8% of cases) or good (79.2%). Up to 6 years radiologic signs of prosthesis loosening were not observed in any case. Deep infection in the early postoperative period was noted in 2 patients (4.2%). Local recurrences were diagnosed in 5 patients (10.4%) and required repeated operations. Those complications did not influence the long-term results.

Conclusions: Use of modern medical technologies (modular prosthesis, arterial embolization, blood reinfusion) at limb sparing operations for tumors of the proximal femur enabled to improve the treatment results and increase the patient’s quality of life.

ID 173

The first experience of using expandable endoprosthesis in Russia
A.Z. Dzampaev, N.M. Ivanova, M.D. Aliev, S.A. Saravaman, N.N. Blokhin Russian Cancer Research Center, Moscow, Russian Federation

Introduction: Bone cancer is commonly treated with removal of the segment of affected bone and reconstructed with an endoprosthesis. Bone cancer is primarily found in the ends of long bones like those found in the knee, hip, and shoulder. The end of these long bones also contains the growth plate or the epiphysis which allows that bone to grow. Therefore, when...
a skeletally immature child has a bone cancer that necessitates the removal of the growth plate, the unaffected limb will continue to grow and create a limb length discrepancy.

Material and Methods: From 2004, endoprosthetic replacement of major joints was carried out by using the expandable endoprosthesis (Wright Medical Technology, USA) at the institute of paediatric oncology allied with N. N. Blokhin Russian Cancer Research Center. Histological diagnosis included: In 3 patients — osteosarcoma of the distal femur, in 1 patient — Ewing’s tumor of the proximal tibia and in 1 patient — osteosarcoma of the proximal humerus. The median age of the patient was 11 — 14 years. Resection of metaphyses with replacement of expandable endoprostheses of knee joint was done in 3 patients who had osteosarcoma of the distal femur. In 1 patient with the diagnosis of Ewing’s tumor, resection of proximal tibia was made and replaced with expandable endoprosthesis. Resection of proximal humerus was made in 1 patient with osteosarcoma of the proximal humerus and replaced with the expandable endoprosthesis.

Results: When exposed to periodic treatments of electromagnetic fields, a compressed spring is allowed to expand, lengthening the "bone" in small increments 5-15 mm in 3-8 seconds, carried out 1-2 times a year.

Conclusions: Since it is noninvasive, it allows children to have their "replacement bone" grow with them without repetitive and traumatic surgeries, hospital stays, and rehabilitations. An expandable Endoprosthesis will allow the operated limb to maintain limb equality through a noninvasive procedure.

ID 267
The role of hip and proximal femur angiographic mapping in tumour excision and endoprosthetic reconstruction
Th. P. Kormas, N. Kokotelis, I. Giakoumakis, E. Giannakopoulos, J. Kyriazoglu
St. Savvas Hospital, Athens, Greece

Introduction: This study displays the hemorrhage risks during limb salvage surgery. We studied the anatomy of the vessels of the hip and proximal femur and we suggest a method to prevent uncontrollable intraoperative bleeding.

Material and Methods: We did preoperative angiograms in 17 patients who had proximal femur excision and complex reconstruction with massive endoprosthesis. The investigation focused on mapping the vessels of the affected area in order to prevent critical intraoperative hemorrhage. We studied arterial, capillary, and vein phases of the angiograms.

Results: The proximal femur is supplied with blood from the vessels of the hip and proximal femur and we suggest a method to prevent uncontrollable intraoperative bleeding.

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Results: The proximal femur is supplied with blood from the vessels of the hip and proximal femur and we suggest a method to prevent uncontrollable intraoperative bleeding.

Conclusion: Any pathology of the hip extended to the shaft of the femur can be treated with excision of a large segment of bone and surrounding soft tissue. These lesions have the risk of massive bleeding, especially if the lesions have rich vascularity. The recognition and ligation of the vessels that supply the bone and the tumor from the medial side, it is of great importance for the bleeding prevention and control.

ID 38
Treatment of grade I-II mediulary chondrosarcoma with cryosurgery and internal fixation
V. Kollender, J. Beckels, A. Nirkin, G. Flusser, J. Issakov, O. Merimsky, A. Gorodetzsky, A. Weinbrum, I. Meller
Tel-Aviv Medical Center, Tel-Aviv, Israel

Introduction: Grade I-II intramedullary chondrosarcomas may be treated by wide resection but in this situation a significant bone gap may occur and need major surgery for correction (bone graft, allograft or a prosthetic replacement). The other option is to perform an intraleosional surgery with adjuvant therapy (pheno, cryosurgery etc.). Our presentation will show that fenestration, curettage and cryoapprcty achieved excellent results in treating low grade chondrosarcomas.

Material and Methods: From 1988-2004 we treated 75 intramedullary grade I-II chondrosarcomas using curettage, burr drilling, cryosurgery and internal fixation using Hardware and PMMA. There were 42 females and 33 males age ranged from 8-78 years (mean 53 years). Anatomic location included The Humerus and Femur in most of the cases and few cases in the Feet, Hands, Tibia, Fibula and the Pelvic bones including Sacrum. All patients received oral antibiotics for two weeks. Lower limb patients were non weight bearing for 6 weeks.

Results: The majority of the cases healed without complications or local recurrence. We had two local recurrences both turned out to be a high grade chondrosarcoma and needed wide resection with prosthetic replacement. There were 5 wound infections all recovered by conservative treatment. There were 3 fractures treated by POP and healed. 3 patients with lesions in the proximal Humerus developed arthritic changes in the shoulder joint and needed a prosthetic replacemet. No local recurrence was found in the grade I-III patients. One patient with a high grade tumor died of metastatic disease.

Conclusions: Cryosurgery is an excellent solution for treating grade I-II intramedullary chondrosarcomas. Internal fixtion and PMMA is mandatory to prevent fractures.

ID 49
Free vascularized fibular graft after resection of upper extremity lesions
V. Kollender, A. Nirkin, G. Weiss, E. Gar, A. Amir, A. Zaretzky, A. Gorodetsky, G. Flusser, O. Merimsky, A. Weinbrum, J. Beckels, I. Kagansky, I. Meller
Tel-Aviv Medical Center, Tel-Aviv, Israel

Introduction: The Fibula is almost a complete dispensable bone since it is a rudiment throughout evolution from quadrupedal ancient ancestors. It almost does not contribute to weight bearing or strength of the leg. The head of the Fibula is almost a perfect substitute for the distal Radius, distal Humerus, Olecranon, and may replace the proximal Humerus. Its process of ossification is the latest in the skeleton so its epiphysis remain open until the age of 18. The peculiar blood supply of the Fibula with its multiple alternatives makes it the ultimate treasure for the microvascular transfer options.
Material and Methods: From 1/1999 to 8/2004 15 patients with upper extremity lesions were operated in our department. The age range was 4-58 years, most of the patient were in the second decade of life. There were 6 females and 9 males. Anatomical location included: 8 distal Radius, 3 mid shaft Humerus, 2 distal Humerus, 1 proximal Ulna and 1 proximal Radius. Pathology included Ewing’s and osteosarcoma in 11 patients, giant cell tumor in 2 patients and osteomyelitits in 2 patients. 4 patients underwent resection with a temporary spacer and a definitive reconstruction after 1-2 years. 9 patients received a definitive reconstruction at the time of resection and 2 patients are with a temporary spacer waiting for definitive surgery. We used an intercalary Fibula in 6 patients and osteoarticular Fibula using the tubular head to replace the Radioarticlar joint or the Elbow joint in 7 patients.

Results: There was one infected non union that needed surgical debridement and bone grafting, we had one transient radial palsy that resolved and one permanent radial palsy. All 13 patients with the early or late reconstruction healed and united to the hosting bones. Function is good to excellent in 11 patients. Moderate in 3 patients and poor function in 1 patient. Onco logical status. No local recurrence was noted so far. All patients are without systemic disease except one patient that developed a single lung metastasis and underwent a thoracotomy.

Conclusions: Fibular microvascular graft is a perfect solution for upper extremity defects created after wide bone resections due to tumoral or other conditions. This solution is chip and may be available in every institution that deals with creating big bone defects.

ID 44
Proximal humerus fixation to the chest wall with the Trevira® tube after Tikhoff-Linberg resection
J. Hardes, W. Winkelmann, A. Streitbuerger, C. Gebert
Department of Orthopaedics, Muenster, Germany

Introduction: Today, most of the patients with a soft tissue or bone sarcoma of the shoulder girdle can be treated by limb-sparing resection. The Tikhoff-Linberg procedure and its modifications are limb-sparing options for tumors in this location. In cases, in which the axillary nerve and the periscapular muscles after tumor resection.

Tikhoff-Linberg fixation should be to achieve a stable shoulder. The goal of this study was to assess, if the fixation of the proximal humerus with the Trevira® tube put around the proximal humerus with refixation to the ribs by Mitek® superanchors would result in a stable shoulder function allowing a normal elbow and hand function.

Material and Methods: 4 patients with a chondrosarcoma grade I-II (mean age 59 years) were treated with a modified Tikhoff-Linberg resection with a refixation of the proximal humerus to the chest wall by using the ‘Trevira®’ tube. An intraarticular scapular resection with preservation of the proximal humerus was performed in 2 patients, 2 patients received an extraarticular resection with a proximal humerus replacement (‘Mutar®’). In all patients a scapular prosthetic reconstruction was impossible because of large tumor volumina. The followup ranged from 6 to 19 months. At final followup all patients were alive without evidence of disease. By clinical and radiographic examination a possible shoulder instability was determined. Functional outcome was assessed according to the Enneking score.

Results: 1 patient suffered a rib fracture after putting in one of the Mitek® anchors. Another patient developed a conservatively treated superficial wound healing complication. A stable fixation of the proximal humerus was assessed clinically and radiographically. The Enneking score was in mean 20 of 30 points.

Conclusions: In patients, in whom a scapular reconstruction is not possible because of loss of periscapular muscles or the axillary nerve, the fixation of the proximal humerus with the Trevira® tube to the ribs by Mitek® superanchors achieved a stable shoulder in all cases allowing a normal elbow and hand function. Muscle coverage is almost always possible with the serratus anterior muscle and the remaining parts of the periscapular muscles after tumor resection.

ID 131
Results of an autopsy after implantation of 3 silver-coated tumor-endoprosthesis
H. Ahrens, J. Hardes, A. Streitbuerger, C. Gebert, W. Winkelmann, G. Gosheger
1 Uniklinikum Muenster Klinik und Poliklinik fuer allgemeine Orthopaedie, Muenster, Germany
2 Umweltprobenbank fuer Human-Organgproben, Muenster, Germany

Introduction: The antimicrobial properties without relevant side-effects of silver-coated megaendoprosthesis have been proven in an animal trial. Therefore these results had to be assayed in a prospective clinical Phase I study (Reg. No. 2Vwin2, ethic commision). In one of these participants material could be taken in an autopsy to assess possible local and systemic side-effects and deposition of silver for the first time.

Material and Methods: Specimens were taken from a 76y old patient (172 cm, 65 kg) suffering from hypernephroma since 1984 (gP2N1M0). After left nephrectomy and polychemothertapy the patient developed metastasis of the left femur, both lungs and right kidney 19 years after primary treatment. The bony lesion was treated with radiation therapy and osteosynthesis after pathological fracture of the left proximal femur in 2003. Because of a deep infection (S. epidermidis), proximal femur was resected and after spacer implantation, a silver coated ‘Mutar®’ megaendoprosthesis was implanted in 18/2003. Further metastasis required resection of left proximal tibia in 02/2005 and right proximal femur in 03/2005. Therefore both defects have been reconstructed with silver-coated ‘Mutar®’ megaendoprosthesis. The pati-
ent died of tumor cachexia 10/2005 without any clinical obvious side effects (i.e. local or systemic argyria) due to the silver coated surfaces. Samples were taken from surrounding tissue of right and left femur, left tibia, the right and left sciatic nerve, pancreas, kidney, liver, brain, heart, lung, tendons, spleen and skin.

Results: Though poor soft-tissue condition after radiation and infection there was no infection seen. F-up blood level after total follow up of 23 months was 20.8 ppb. Highest silver concentration were found next to the implants (right femur 981.2 ppb, left femur 9759 ppb, left proximal tibia 1465 ppb), the liver (1722 ppb) and the skin (2762 ppb) without histological signs of damage or inflammation. Others contained: testicles 193.3 ppb, right sciotic nerve 108.7 ppb, left sciatic nerve 323.3 ppb, pancreas 154.4 ppb, right kidney 128.2 ppb, lung 179.8 ppb, heart 40.1 ppb, spleen 112.2 ppb, brain 496.6 ppb. Local or systemic argyria and microscopical depositions could not be found.

Conclusions: Even after implantation of three silver-coated Megandoprosthesis after nephrectomy and the high amount of metallic silver surface, no clinical side effects or organ damage could be noticed. Further results from other patients are pending.

ID 98
Tikoff Linberg procedure of the superior extremity for tumors in the scapulo-humeral space
Instituto Nacional De Cancerologica, Mexico, Mexico

Introduction: In recent years, conservative surgery has replaced the amputation as main treatment for sarcomas of the bone and soft tissue. The objective of our study was to show the experience of the Instituto Nacional De Cancerologica, in the management of scapulo-humeral region of the superior extremities tumors with conservative surgery (interscapulo-humeral resections).

Material and Methods: Retrospectively were reviewed the clinical records of patients that underwent an interscapulo-humeral resection for tumors either benign or malignant (locally aggressive) in that region from 1978 to 2004. Information about tumor, patients characteristics, neoadjuvant and adjuvant treatment was collected. Events related to the surgery, type of reconstruction, follow up and functionality and only three (12%) limited.

Almost half of the patients 12 (48%) have an acceptable functionality and two systemic relapses (9 and 12 months). One patient had persistence. Mean follow up was of 37.1 months. A local recurrence at seven months after surgery was observed and two systemic relapses (9 and 12 months). One patient had persistence. Three patients (12%) required the use of narcotic analgesics. Almost half of the patients 12 (48%) have an acceptable functionality and only three (12%) limited.

Conclusions: The interscapular-humeral resections are a safe procedure, it does not compromise the survival of the patients with tumors of the scapulo-humeral space, it provides an adequate local control and is useful in all the subgroup of patients studied.

ID 85
Lateral malleolo en bloc resection for malignant hemangiendothelioma and treatment with distraction osteogenesis

Introduction: Lateral malleolo is crucial for ankle stabilization. In the treatment of tumors of distal fibula, instability is inevitable after on bloc resection. In this paper an 18-years-old patient whose Lateral Malleolus was resected due to a malignant hemangiendothelioma is presented. Instability after resection was managed with bone transport and lateral ligamentous reconstruction.

Material and Methods: Case Report: 18-year-old male patient applied for a treatment with the complaints of swelling and pain in the left ankle. He had had two curettage and bone grafting operations for simple bone cyst of left distal tibia. He had swelling and tenderness on the lateral malleo-lus. Homatological tests were normal. On the x-ray, sclerosis in distal tibial metaphysis, lytic and erosions in distal fibula were seen. Sclerosis in the distal tibia and a mass lesion in the distal 1/3 tibula were detected in MRI. e took biopases of the distal tibia and tibia. There was normal and sclerotic bone and fibrotic tissue in the distal tibia and malign hemangioendotheloma on the fibula.

Results: Surgical Technique: Anterior and posterior talofibular and calcaneocubular ligaments were identified using with lateral ankle incision, marked with nonabsorbable sutures and cut close to the lateral malleolus. Then 11 cm distal tibia was resected with the tumor tissue covering it. After resection, a 0.5 mm soft cerclage wire was fixed to the distal edge of the remaining proximal fibula while the other end of the wire was pulled out from the heel. Then the wound was closed. A circular frame with 3 rings was constructed and the proximal tibia, distal tibia and the foot were fixed. Percutaneous corticotomy was performed 5 cm proximal to the resection line. Fibula was carried via internal transport to the distal area by pulling out the cerclage wire 1 mm/day (we call this technique is “bone only method” and it was published at 18th annual meeting of EMSOS). In the 5th month, the fixator
was removed and a lateral ankle incision was opened. The ligaments marked beforehand were sutured to the lengthen-
ed fibula which was fixed to the tibia with two screws. Per-op instability was not detected with the full range of movements of the ankle. An 8-weeks protective cast was done.

Conclusions: Bone transport and ligament reconstruction were successful in treating a defect and ankle instability due to distal fibular resection. After the treatment, a radiologic and functionally stable ankle was created.

ID 179

Functional outcomes of hindquarter amputation versus the use of pelvic spacers and radiotherapy in tumors


1 Royal National Orthopaedic Hospital, Stanmore, United Kingdom
2 University College London Hospital, London, United Kingdom

Introduction: Malignant tumours of the pelvis are difficult to manage. Hindquarter amputations are indicated in primary bone sarcomas of the pelvic girdle and soft tissue sarcomas in the pelvic region. These operations are mutilating, with high morbidity and mortality rates. Overall survival is poor and there may be a place for less mutilating treatment which achieves the aim of pain relief and restoring function by improving or preserving mobility. Patients who have an inoperable tumour or who refuse amputation may have a pelvic spacer inserted to displace bowel and allow a high dose of radiotherapy. We report a series of patients who presented with malignant tumours of the pelvis and compare the functional outcomes of patients who had a hindquarter amputation with patients who had a pelvic spacer inserted to facilitate high dose local radiotherapy.

Material and Methods: All patients who underwent an insertion of a pelvic spacer and local high dose radiotherapy were identified. They were matched as closely as possible with respect to age, sex, diagnosis, tumour stage, and follow-up period to patients who had a hindquarter amputation. Available patients were followed up and evaluated using the Musculoskeletal Society Tumour Score (MSTS) and the Toronto Extremity Salvage Score (TESS).

Results: 9 patients had an insertion of a pelvic spacer and radiotherapy. 5 had Ewing’s sarcoma, 3 had osteosarcoma and 1 had alveolar soft part sarcoma. 7 tumours arose in the ilium, 2 in the ilium and sacrum, and 1 in the retroperitoneum. 2 patients had primary metastases on presentation. These patients were matched with patients who had a hindquarter amputation. The average follow-up was 21 months. Patients with pelvic spacers and radiotherapy averaged an MSTS score of 51.5% and a TESS of 60%. Patients with hindquarter amputations averaged an MSTS score of 57% and a TESS of 52%.

Conclusions: Hindquarter amputation for malignant pelvic tumours is a mutilating operation that has high morbidity and mortality. Patients invariably have a poor prognosis and there may be a role for management with high dose local radiotherapy which provides palliation and preserves function. Patients who have an inoperable tumour or who refuse an amputation can be treated with local radiotherapy. The functional outcomes for this group of patients are comparable to those who had hindquarter amputations, with the advantage that they do not have such mutilating operations.

ID 250

Surgical resection and reconstruction for malignant chest wall tumors

J. Bytkov, V.A. Sobolevsky, M.D. Aliev, M.I. Davydov

N.N. Blokhin Russian Cancer Research Center, Moscow, Russian Federation

Introduction: Radical resection is optimal variant of treatment of malignant chest wall tumors. Improvement of reconstruction techniques is very important in patients with wide chest wall defects. Nowadays there are no common standards of reconstruction of chest wall tumors. Purpose was to analyze our experience in surgical treatment of patients with malignant chest wall tumors.

Material and Methods: From 1990 to 2005, 51 patients underwent surgical treatment for malignant chest wall tumors. There were 32 males and 19 females with a median age of 42 years old (range 15-70 years). 2 patients underwent sternectomy, 9 patients subtotal resection and 4 patients partial sternal resection. Resection of one or two ribs was performed in 15 cases, 3 ribs and more in 18 cases. Resection of ribs and sternum was performed in 3 cases. The involved lung and mediastinal structures were excised en bloc. Reconstruction of the thoracic wall was performed in 12 patients. Prosthetic materials covered by flaps of myocutaneous or muscle tissue were used in 6 patients, prosthetic material alone in 2, myocutaneous or muscle flaps alone in 4.

Results: The resection was radical in all cases. No complications after reconstruction techniques were observed. All patients after reconstruction had satisfactory postoperative respiratory activity.

Conclusions: Large sternal defects resulting from wide resection of malignant chest wall tumors can be safely reconstructed with a myocutaneous flap and prosthetic materials. There are well functional results after surgical procedures.

ID 47

Rotationplasty over the age of 60 functional outcome and an analysis of complications


1 Department of Orthopaedics, Munster, Germany
2 Department of Orthopaedics, University of Zurich, BALGRIST, Zurich, Switzerland

Introduction: Before the era of endoprosthetic devices, rotationplasty, which was introduced in 1974 by Saltzer in the surgery of malignant bone tumors and modified by Winkelmann, protected many patients from an amputation. Despite many authors favor limb saving procedures today, rotationplasty obtained excellent functional and psychosocial results. Rotationplasty can be still recommended in tumors with a great soft tissue component, as a salvage procedure in the case of a failed limb salvage procedure and in very young children as an
alternative to growing prostheses. A rotationplasty in patients over the age of 60 years is a rare procedure and to our knowledge no data about the complication rate and functional outcome have been reported in the literature.

Material and Methods: 3 patients with an age over 60 years (mean 65, range 62–70) were treated with an AI rotationplasty. The indications for rotationplasty were: 1 dedifferentiated liposarcoma of the ventral thigh with an intraarticular tumor involvement, 1 malignant schwannoma grade III of the quadriceps muscle (received adjuvant radiation therapy) and 1 malignant fibrous histiocytoma of the popliteal fossa (received adjuvant chemotherapy). The follow up ranged from 6 months to 13 years. At final followup 2 patients were alive without evidence of disease. The patient with the malignant schwannoma died of disease due to lung metastasis 12 months postoperatively. Functional outcome was assessed according to the Enneking score.

Results: The patient with the MFH developed a thrombosis of the femoral vein 6 months postoperatively resulting in a moderately lymph oedema. 2 patients needed a cane for a gait distance of more than 200 meters. The walking distance even with support was reduced. The range of motion of the ankle joint was not markable restricted. No patient had pain. The mean Enneking score was 19 of 30 points.

Conclusions: Rotationplasty is a good alternative to an above-knee amputation even in older patients because they have a “neo” knee joint without a functional relevant restriction in the range of motion. Furthermore, no phantom pain occurred and they have no loss of proprioception. However, the functional results are not comparable to younger patients, who regain mainly normal walking and sporting abilities.

External hemipelvectomy
National Cancer Institute Mexico, Mexico

Introduction: Despite the development of successful therapeutic modalities for local sarcomas control and advances in limb-sparing surgery around the pelvis and hip, the hemipelvectomy often remains the optimal surgical treatment in primarily tumors or recurrences of the upper thigh, hip and pelvis.

Material and Methods: Retrospective review of 78 external hemipelvectomies performed at National Cancer Institute Mexico, during the period 1978–2003 mainly for bone and soft tissue sarcomas. Overall survival was calculated using the method of Kaplan and Meier and differences were calculated using the log-rank test.

Results: There were 78 patients, 49 were males and 29 females. The mean age was 36 years (range 16–80 years), the most frequent tumors were osteosarcoma 12 patients, synovial sarcoma and chondrosarcoma 11 patients respectively. The posterior flap was performed in 61 and anterior flap in ten cases, 6 patients died within 30 days of the operation because hypovolemic shock, cardiac failure and sepsis, one patient die 51 days after surgery. These 7 cases were not entered in analysis for complications and survival. The mean tumor size was 18 cm, the mean blood loss was 1617 ml (range 0.25–8 l) and mean duration of procedure was 3.93 hours (2.10–9.45 hours), negative margin was obtained in 55 of 71, postoperative complications occurred in 54 patients, including wound infection 44%, dehiscence 22% and flap necrosis 11.5%, 36 patients had local complications and other complications in 18. The surgical mortality was 8.9%, fifty percent were dead at 7.5 months. 3 years survival is 12%.

Conclusions: The external hemipelvectomy is a rare procedure with considerable morbidity and mortality. Must be considered as a palliative surgery even without metastatic disease. It offers a chance of palliation and possibly cure.

ID 141
Free and advancement autografting in the treatment of locomotor tumors
A. Zheravin, K. Selyaninov, I. Anisenya, E. Gorbatov
Cancer Research Institute, Tomsk, Russia

Background: Application of flaps with axial blood supply enlarges indications of radical surgery in locally advanced locomotor malignancies. The purpose of this study was to analyze efficacy of free and advancement vascularized autografting for bone and soft-tissue defects in the multi-modality approach.

Materials and Methods: Single-step reconstruction using vascularized autografts in combination with intraoperative radiotherapy (IORT) and distant gamma-therapy (DGT) has been applied at the Department of General Oncology since 2004. Multi-modality treatment was given to 13 patients (pts) aged 19 to 69 years including 6 cases with soft-tissue sarcomas (malignant fibrous histiocytoma, rhabdomyosarcoma, fibrosarcoma), 2 cases with osteogenic sarcoma, 1 case with cutaneous melanoma, 1 case with cutaneous cancer, 1 case with pseudocarcinomatous epithelial hyperplasia and 2 cases with lytic bone osteoblastoma. Lesion sites were soft tissues of the chest wall (2), foot (2), leg (1), hand (1), radial bone (1), femoral bone (2). All pts underwent removal of the tumor by wide dissection (10) or segmental bone resection (3). Plasty for soft-tissue defects was made using free or advancement vascularized autografts in combination with intraoperative irradiation. Distant gamma-therapy was given in 6 pts immediately after tumor removal at a single tumor dose 10–15 Gy. Additional DGT by standard fractions was given to 6 pts.

Results: 3 pts developed early postoperative morbidity as partial flap necrosis resulting from intraoperative technical errors. In 10 cases postoperative course was uneventful, cosmetic and functional results were assessed as perfect or good. One patient developed soft-tissue recurrence outside the IORT zone.

Conclusions: First outcomes of free and advancement autografting in combination with various radiotherapy approaches in multi-modality treatment for locomotor malignancies have demonstrated good tolerance of the technique.
Postresection defect correction with titanium nickeltide in the treatment for bone tumors  
A.V. Bogoutdinova, I.I. Anisenya  
Cancer Research Institute, Tomsk, Russia

Background: The study was performed in 159 patients (pts) with bone tumors. Pts from the test group (83) with sarcomas (19, 22.4%) or benign tumors (66, 77.7%) had their postresection defects corrected with porous titanium nickeltide. Control pts (74) with sarcomas (16, 21.6%) or benign tumors (58, 78.4%) received bone autografting.

Results: Early postoperative morbidity was practically equal in the test and control groups (5.9% vs 6.7%). Suppression was reported in 2/85 (2.3%) pts from the test group, both with sarcoma (2/19, 10.5%), and in 2/74 (2.7%) control cases, both with sarcoma (2/16, 12.5%). Time to bone callus formation at the bone-porous implant borderline in test group pts was 11±12 mos vs 10±5-12 mos at the bone-autograft borderline in the control pts. Porous implant fracture was observed in 2/85 (2.3%) cases. Control pts presented with events related to remodeling of the graft and mother bone as fracture in 2/74 (2.7%) cases with sarcoma (12.2%) who received combination therapy with IORT at 15 Gy. Follow-up complications were reported in 4/85 (4.7%) pts from the test group vs 3/74 (4%) in the control, differences in the number or structure of the events were not statistically significant.

Conclusions: Two of 85 (2.4%) test group pts underwent amputation surgery and in 2/74 (4.7%) vs 11/16 (68.8%) sarcoma pts respectively.

Applying of orthopaedic cement in surgical treatment of bone tumors and tumor-like formations  
A.T. Amiraslanov, E.E. Ibragimov, A.A. Amiraslanov, S.D. Tagiyev  
Azerbaijan Medical University, Baku, Azerbaijan

Background: We studied efficacy of orthopedic cement in postresection defect replacement in cases with bone tumors and tumor-like lesions.

Materials and Methods: A total of 208 surgical operations for primary bone tumors and tumor-like lesions were performed using orthopedic cement at the AMU Cancer Clinic during 1992 through 2005. Patient age ranged from 4 to 50 years, using orthopedic cement at the AMU Cancer Clinic during primary bone tumors and tumor-like lesions were performed.

Results: There were no implant rejections or allergic reactions. A small number of patients (6.7%) presented with hyperthermia within the first 24 hours postoperatively. Function recovery of the extremity was observed from week 2 to month 6 following surgery; bone tissue remodeling was detected by x-ray 6 to 12 months following surgery. We used orthopedic cement to replace bone defects because convenient bone plasty techniques have certain disadvantages. Autografting provides good results but increases considerable extent of surgical intervention and adds to patient trauma (particularly in children and adolescents). While allografting is associated with immunity havoc and increased risk of infection.

Conclusions: Orthopedic cement can be used successfully instead of conventional auto- and allografting, improves immediate and follow-up functional outcomes of large joint implant, reduces the risk of allergic and infectious complications, reduces considerably extent and severity of surgical intervention.

Surgery for osteolysis in multiple myeloma  
T.P. Kormas, G. Giakoumakis, E. Giannakopoulos, N. Koutselinis, J. Kyriazoglou  
St. Savvas Hospital, Athens, Greece

Introduction: We studied the results of surgery of pathological fractures in patients with multiple myeloma to show the best treatment options.

Material and Methods: We treated 14 patients with multiple myeloma complicated with pathological fractures. They had multiple osteolytic lesions that resulted in active and impenetrable fractures of hip, proximal humerus, femoral and humeral shafts and pelvis. The cases with lesions close to joints were treated with arthroplasty; the lesions of the shaft of long bones had interlocking intramedullary nailing. In a subtrochanteric fracture we did ORIF with double plates. All the cases had external irradiation and chemotherapy.

Results: The nailing of the shaft of the humerus was difficult in active fractures due to the extent of osteolysis. We had severe, expected, intraoperative bleeding in two hip reconstructions. Although platelets count was normal, obviously their function was deficient and caused the hemorrhage. Bleeding was managed with transfusion of platelets and trauma volume reduction. All the patients were mobilized out of bed soon after surgery. All they were examined on follow up (average 12 months) except for one patient who died due to the disease. All reconstructions were stable and the patients were satisfied. The patients with impending fractures had no complications and they had full restoration of function soon.

Conclusions: Patients with multiple myeloma and fracture present specific problems. They need surgical management, provided that the proper measures for dangerous complications, such as bleeding, are taken. Preventing operative treatment of impending fractures in selected cases has the best results and less complication rates.
Replant irradiation was made with an electron beam using a detectable tumor mass, replanted and fixed by osteosynthesis. Exposure to extracorporal irradiation after removal of all demineralized areas in patients (pts) with locally advanced bone sarcomas has been ineffective. Intraoperative radiotherapy (IORT) may replace treatment of patients with bone sarcomas and myeloma, above all in nonsecretory variants, goes unexplored even in those patients that have a focal osteolytic lesion, often asymptomatic.

**Material and Methods:**

Three patients, from 35 to 68 years, come to the clinical observation for persistent painful symptoms. Any trauma was referred. In a patient, with previous diagnosis of melanoma, the clinical suspect was of bone metastasis. In the other patients, without particular anamnestic data, the suspect was about orthopedic non neoplastic pathology. CR and CT noticed an osteolytic area with different features: in a patient it was on the iliac wing (the suspect was an aneurysmal bone cyst), in the second one on the tibia and in the third, on the humerus (with wide invasion of the soft tissue). In 2/3 of the patients was performed CT-guided biopsy while, in the patient with suspects metastasis was performed resection of the pathological bone.

**Results:** The histological diagnosis in all the patients was of myeloma; two with secretion of lambda chains, one of k chains. Only 2 patients had a monoclonal peak.

**Conclusions:** The biopsy represents the “gold standard” to define the etiology of an osteolytic lesion, often asymptomatic, in patients with clinical-radiologic data not simple to describe as the myeloma diagnosis still today represents a diagnostic challenge whenever the clinicians observe an osteolytic lesion in patients with clinical history and suggestive imaging of orthopedic pathology.

**ID 251**

**Plasmacellular myeloma with unusual clinical debut:**

A. Kurilich, V.A. Bizer, G.T. Kudrjansvseva, A.I. Zubarev

Medical Radiology Research Center, RAMS, Obninsk, Russia

**Introduction:** Plasma cell myeloma is a bone marrow-based multifocal plasma cell neoplasia, in monofocal type plasma-cytoma (cycloceptically and immunophenotypically identical). The diagnosis is based on a combination of well-known pathological, radiological and clinical features. Our purpose is to describe the myeloma diagnosis still today represents a diagnostic challenge whenever the clinicians observe an osteolytic lesion in patients with clinical history and suggestive imaging of orthopedic pathology.

**Material and Methods:**

Three patients, from 35 to 68 years, come to the clinical observation for persistent painful symptoms. Any trauma was referred. In a patient, with previous diagnosis of melanoma, the clinical suspect was of bone metastasis. In the other patients, without particular anamnestic data, the suspect was about orthopedic non neoplastic pathology. CR and CT noticed an osteolytic area with different features: in a patient it was on the iliac wing (the suspect was an aneurysmal bone cyst), in the second one on the tibia and in the third, on the humerus (with wide invasion of the soft tissue). In 2/3 of the patients was performed CT-guided biopsy while, in the patient with suspects metastasis was performed resection of the pathological bone.

**Results:** The histological diagnosis in all the patients was of myeloma; two with secretion of lambda chains, one of k chains. Only 2 patients had a monoclonal peak.

**Conclusions:** The biopsy represents the “gold standard” to define the etiology of an osteolytic lesion, often asymptomatic, in patients with clinical-radiologic data not simple to describe as the myeloma diagnosis still today represents a diagnostic challenge whenever the clinicians observe an osteolytic lesion in patients with clinical history and suggestive imaging of orthopedic pathology.

**ID 29**

**The use of massive endoprosthesis for the treatment of isolated bone metastases**


Royal National Orthopaedic Hospital, Middlesex, UK

**Introduction:** The recent advances in adjuvant and neoadjuvant therapy in cancer treatment has resulted in improved prognosis of patients with bone metastases. Most patients who have either an actual or impending pathological fracture should have operative stabilisation or reconstruction. Endoprosthetic reconstructions are indicated in patients with extensive bone loss, failed conventional reconstructions, and selected isolated metastases.

**Material and Methods:** We identified all patients who were diagnosed with metastatic disease to bone between 1999 to 2003. A review of all histological reports in this period was carried out to identify these patients. 171 patients were diagnosed with bone metastases. Metastatic breast and renal cancer accounted for 47% of the lesions. 38 patients with isolated bone metastasis to the appendicular skeleton had an endoprosthetic reconstruction.

**Results:** There were 28 males and 30 females. 11 patients had lesions in the upper extremity and 47 patients had lesions in the lower extremity. The mean age at presentation was 62 years (range 24 to 88). At the time of writing, 19 patients were still alive, 34 patients had died and 5 were lost to follow-up. Patients were followed up and evaluated using the Musculoskeletal Society Tumour Score (MSTS) and the Toronto Extremity Salvage Score. The mean MSTS was 73%, and TESS was 71%. Mean follow-up was 54.6 months (range 24 to 78). Complications included 6 wound infections, 1 aseptic loosening, 6 dislocations, 1 subluxation, and 1 prosthesis rotated requiring open repositioning.

**Conclusions:** We conclude that endoprosthetic replacement for the treatment of isolated bone metastases can be a useful alternative reconstruction in selected cases and achieves the aims of restoring function, allowing early weight bearing and alleviating pain.
Choice of tactic and optimal method of surgical treatment in patients with long bone metastatic lesions

F.V. Trufainko, V. Karpenske, M.D. Alexy
P.A. Herstsen Moscow Cancer Research Institute
N.N. Blokhin Russian Cancer Research Center, Moscow, Russian Federation

Introduction: Develop and introduce main factors to choice tactic and method of surgical treatment patients with bone metastases complicated by pathologic fractures.

Material and Methods: 84 patients with bone metastases were operated. We used segmental resections with endoprosthetic replacement at 25 patients, immovable osteosynthesis (IO) at 23 patients and transosseous osteosynthesis (TO) at 36.

Results: The functional results evaluated at 65 survived patients. Perfect results were received at 23 (36%), good — 30 (48%), satisfactory — 12 (18%) patients. When we analyzed enumerated patients group we fined the main determine factors to choose the optimal treatment tactic. We made algorithm contain seven factors in summation the point of these factors is possible to determine a tactic of treatment for everyone patients. Active surgery tactic is need 0 — 8 point; surgical treatment is possible 9 — 10 point; surgical treatment not uses 11 — 14 point. To choose the priority method of surgical treatment, in addition to algorithm, we developed a plate. She considered eight factors witch help determined a priority method of surgical treatment for patients.

Conclusions: The problem of surgery treatment patients with pathological fracture and their menace under dissemination neoplastic process in long bones is actual. Main obstacles lay in algorithm selection tactic and optimal methods of surgical treatment this serious group of patients. Therefore, the selected showings grouped with multiple classification should help a doctor done a right choose the tactic and method of operative treatment patients with bone metastases complicated by pathologic fractures or with menace of it.

“Biologic” surgery of skeletal metastases: open nailing and freezing by liquid nitrogen

V. Ignatov, M. Succulutti, L. Ianni
Orthopedic Oncology, Civil General Hospital, Brescia, Italy

Introduction: Surgical treatment of bone metastases should have two goals: restoring the bone mechanical strength and prevent local progression of the tumor lesion. The first problem is best solved by intramedullary fixation enhanced with cement or by prosthetic replacement of the affected bone. The second problem is generally approached by postoperative radiotherapy. Radiation therapy, however, is not always effective in preventing local progression. Furthermore, Rubin had demonstrated that radiotherapy, blocking the chondroblastic phase of callus formation, prevents pathologic fractures from healing. For this reasons, applying to pathologic fractures the principles of trauma surgery exposes to a high risk of failures. A correct, “biologic” treatment of pathologic fractures has to remove the viable tumor tissue in the metastatic site, restore immediately the bone mechanical strength and last as much as the patient’s residual life.

Such “biologic” treatment of metastases can be effectively achieved only by an open intramedullary procedure, with a thorough curettage, the use of effective local adjuvants (we use liquid nitrogen), intramedullary nailing and cementation, or by a resection.

Material and Methods: In our Unit of Orthopedic Oncology this “biologic” surgery is our standard since 1981. Over 1000 metastatic lesions (impending or pathologic fractures and painful lesions) have been treated this way.

Results: Pain control is close to 100%; local control has been achieved in 94% and 85% of those who were able to walk before surgery regained weight bearing.

Conclusions: Applying the conventional techniques of trauma surgery to metastatic lesions exposes to many failures and can jeopardize the patient’s residual life. A “biologic” procedure including curettage, cryosurgery with liquid nitrogen, intramedullary nailing and cement, is an effective way to solve the patient’s problem for all his residual life.
ID 209
The role of vertebroplasty in treatment of tumoral lesions of spine. Medical trial
A.K. Valiev, E.R. Musaev, I. Tiurin, M.D. Aliev
N.N. Blokhin Russian Cancer Research Center, Moscow, Russian Federation

Introduction: Tumoral lesion of the spine is a complex many-sided problem, lying on the edge of different specialties, such as oncology, orthopedy and neurosurgery. This problem is of great importance, because of high incidence of tumoral lesions of the spine and serious affection quality of life of these patients. Primary benign tumors (hemangiommas) are meet in 40% of popularity, and clinical presentations are meet only in 5-10%. 15% of all primary malignant bone tumors located in the spine. As to metastatic lesions of the spine they occurs in 5-33% of cancer patients. The first and most often complaint of patients with tumoral lesions of the spine is pain syndrome, which moderately affect to patients quality of life. The pain syndrome occurs in 70% of these patients.

Material and Methods: In this article is presented clinical experience of treatment of 70 patients with tumoral lesions of the spine to whom was performed 89 vertebroplasties. There were 32 (46%) men and 38 (54%) women. Mean age was 53 years (16 to 74). Benign tumors were in 20 (29%) patients, primary malignant and metastatic in 45 (64%) patients. Nontumoral lesions – in 5 (7%) cases. The level spread was: cervical – 1 (2%), thoracic – 43 (62%), lumbar – 26 (36%) patients. Three (4%) had minor sensory disturbances. Pain syndrome, measured by Watkins scale was present in 69 (98%) patients. Mean cement volume injected in the thoracic spine was 3,2 ml and 5,2 ml in lumbar region. Vertebroplasty as mono treatment was used in patients with benign tumors and nontumoral lesions. And as a part of combined treatment in metastatic lesions.

Results: Moderate decreasing or disappearance of pain syndrome was in 62 (89%) patients. The level of pain didn’t change in 6 (9%), and increased in 2 (3%) patients. Mean analgesic period consisted 27 hours (2 to 84). Clinical complications were seen in 2 (3%) patients, and to one them was used urgent decompressive surgery.

Conclusions: Vertebroplasty is effective small invasive treatment procedure in patients with osteolytic lesions of the spine, affording moderately decrease pain syndrome in 86% patients and thus to improve the quality of their life.

ID 38
Organ-preserving methods of surgical treatment of long bone metastatic lesions in patients with kidney cancer
V.V. Tepliakov, V. Karpenko, M.D. Aliev
1 P.A. Hertsen Moscow Cancer Research Institute, Moscow, Russian Federation
2 N.N. Blokhin Russian Cancer Research Center, Moscow, Russian Federation

Introduction: Demonstration the modern ability of organ-preserving treatment the patients with kidney cancer.

Material and Methods: 21 operations were performed in 18 patients. Menace of pathological fracture was at 5 patients, at 13 it happened. Solitary metastatic lesion of long bones was detected at 6 (34%), and multiple at 3 (17%) patients. Segmental resection with endoprosthetic replacement (SRE) was done at 9 (50%) patients. The three of these patients had the menace of pathological fracture. Immersible osteosynthesis (IO) was used at 3 (17%) patients with pathological fracture. Transosseous osteosynthesis (TO) was used at 6 (33%). Two of these patients had the menace of pathological fracture.

Results: Follow-up period was 2 – 36 month. The regress range of pain (by R.G. Watkins) was registered at 11 (61%). The improvement of condition by Karnofski was registered at 8 (44%). Positive dynamic in anatomic-functional status by Enneking at 13 (73%). Follow-up period after operation was consisted of 36 months, 11 (62%) live longer (calculated by Kaplan-Meier). Medial probability of survival operated patients with metastatic lesion of long bones on conditions with eliminated is consist 13,5 months, with primary tumor - 8.

Conclusions: Operative organ-preserving methods: SRE and IO can control or diminish the pain, in short period of time restore the function of involved limb, improve quality of life and meet the requirements of palliative help. TO can be used only how the stage of fixation with following SRE.