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A new mini-fixation system for hand, wrist and foot

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This study describes a new external fixation system, devised by the author.

The external fixation described uses K wires, with or without a short screw thread. The fixation system is completed by slotted wire ends and small nuts, making a total of three components. This construction renders it possible to induce compression or distraction, if necessary afterwards. It is also possible for a K wire to be drilled obliquely, for instance through the fracture.

Twelve patients were treated according to this method. Indications for the treatment were: digital and metacarpal fractures, arthrodeses of the proximal interphalangeal (PIP) joints of fingers, pseudarthrosis of the index finger, (re)arthrodesis of the carpo-metacarpal (CMC) joint of the thumb and arthrodesis of the metatarso-phalangeal (MTP) joint of the big toe. Functional after-treatment was administered. Redislocation of a fracture occurred once. All treatments resulted in consolidation, no (pin hole) infections occurred.

Conclusion: The mini-fixation system constitutes a useful supplement to existing therapies in small bone surgery.

Conservative treatment of acute insufficiency of the anterior cruciate ligament A prospective follow-up study

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Introduction: Since it is impossible to predict whether immediately after occurrence of a rupture of the anterior cruciate ligament (ACL), symptomatic instability will occur, an initial conservative management is frequently rec-

ommended. On the one hand there is the risk of over-treatment (acute or subacute ACL reconstruction), while on the other an unstable knee runs an increased risk of secondary damage. In order to determine whether there exist parameters with predictive value with regard to occurrence of a symptomatic instability after a conservatively treated ACL rupture, a prospective follow-up study was carried out.

Material and method: Between May 1990 and April 1992, 137 patients with hemarthrosis of the knee after injury were subjected to a clinical and arthroscopic examination. Seventy-one patients, who never previously had had a knee injury, met the criteria for this study: a rupture of the ACL (with or without damage to the collateral ligaments), no injury of the posterior cruciate ligament (PCL), meniscus intact or with only a rupture to be repaired by suturing, no instability of the contralateral knee. The arthroscopic intervention included cleansing of meniscal ruptures and cartilaginous lesions; lesions of cruciate ligaments or collateral ligaments were not repaired. Postoperatively, all patients were subjected to a training program aimed at muscle and coordination training, without use of plaster splints or braces.

Results: The results of this treatment were evaluated in all patients after an average of 2.4 years. In patients with symptoms bad enough to necessitate consideration of a secondary ACL reconstruction, evaluation was done immediately before operation. Application of the subjective scoring list of Noyes showed that 47 patients (66%) had a fair to good result (81–100 points, group A). Of the other 24 patients (34%) with a moderate to poor result (group B), 14 (20%) were subjected to ACL reconstruction, on average one year after the injury. Passive stability of the knee of patients in group B had decreased, that of the patients of group A increased during the follow-up period. The activity level of all patients prior to the injury had no predictive value regarding the ultimate result in either group. Meniscal rupture and/or cartilaginous damage resulted in a poorer functional result, and the same held true if the knee injury concerned the dominant leg. A 3+ pivot shift established after the injury under anesthesia was found to be related more often to a poor result than a less pronounced pivot shift. Nevertheless, the probability of a good result in these patients (group A) still amounted to 60%.

Conclusions: A positive pivot shift under anesthesia and a high level of activity prior to the injury appear not to be good criteria to refrain from conservative treatment in case of an acute ACL rupture. Lesions of the knee of the dominant leg, meniscal rupture and/or cartilaginous lesions correlate to a poor clinical result.

Revision surgery of the hip with spongy bone allografts and a CPT (Collarless Polished Taper, Zimmer, Warsaw, USA) prosthesis

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Revision surgery of the hip with presence of large defects in the femur in our clinic includes use of an impacted allograft in the femur. A CPT hip prosthesis is cemented into this.

Four patients 11 to 18 months after revision surgery were subjected to a biopsy from the osteoplasty area in the proximal femur. This brought to light not only cortical bone but also newly formed spongy bone. The observed vitality of the osteoplasty area justifies optimistic expectations of the technique applied.

Unfavorable experiences with the uncemented Harris-Galante (Zimmer, Maarsen) femoral component in total hip arthroplasty

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Introduction: The results of many uncemented hip prostheses are inferior to the results of cemented prostheses, among other things due to mid-thigh pain.

Objective of this study: To investigate the clinical and radiographical results of a cementless total hip prosthesis used by us, the Harris-Galante prosthesis.

Patients and method: In the period 1986–1991, a total of 68 Harris-Galante prostheses were implanted in 63 patients. 53 patients with 57 hips were followed up after an average of 40 months. The posterolateral approach was used 40 times, the lateral approach 17 times. 53 Mecron screw cups

(Surgiplant, Kaatsheuvel), one Harris-Galante pressfit cup and three cemented cups were implanted. The Harris hip score was determined preoperatively and at the follow-up. Presence of mid-thigh pain, inguinal and gluteal pain was recorded and radiographs were made routinely in two projections.

Results: The preoperative mean Harris hip score amounted to 39, the postoperative one to 81. Only 34 hips were classified as excellent or good. Mid-thigh pain was present in 30 patients, inguinal pain was recorded nine times. No correlation could be demonstrated between the Harris hip score and pain complaints on the one hand, and the surgical approach on the other.

Radiography: Signs of loosening were observed in 10 femoral components and in 4 acetabular cups. Periarticular ossifications were encountered in 29 hips, the frequency being significantly higher after operations using the lateral approach ($p < 0.01$). No other correlations could be established between clinical signs and symptoms and radiographic findings.

Conclusions: Both the clinical scores and the radiographic findings show that the results of the hip arthroplasties performed in these patients were poor. It appeared that these poor results had to be attributed mainly to inadequate fixation of the femoral component. Since no relationship was found between clinical results and 'routine' radiographic examination, the relativity of the value of standard radiography is once more underlined, particularly also because any migration of prostheses cannot be established adequately. In view of the experiences described above, the authors advise against the use of the Harris-Galante femoral component in total hip replacement operations.

The reaction of metal detectors to orthopedic implants

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Introduction: The last few decades have seen a pronounced increase of the use of metal implants at operations, such as articular prostheses and osteosynthesis material. The mobility of the population has increased as well; air travel has become common. For these reasons, patients often ask the orthopedic surgeon if the usual implants might give rise to problems at security checks carried out at airports in particular.

Material and method: An enquiry was conducted among 50 operated scoliosis patients selected at random. They were asked whether they had ever undergone a check at an airport by means of a metal detector and whether this detector had reacted to the implant.

Furthermore, several types of implants were tested with two types of metal detectors, in cooperation with the Schiphol National Police Force. Also, the functionaires per-

forming the metal detector checks at Schiphol were asked about their experiences, if any, with the registration of metal implants.

46 of the 50 questionnaires were completed and returned; 22 respondents had undergone one or several checks with a metal detector. In three cases, the alarm had sounded, at smaller airports or in discotheques.

Conclusions and recommendations:

1. In general, no reactions to medical implants are to be expected of metal detectors in airport 'gates'. This is to be attributed among other things to the fact that metal detectors are relatively insensitive to the high-grade alloys of which medical implants are made and the fact that during production, the amount of metal used is adjusted to a certain minimum.
2. The metal detector 'adds up' the masses of the metal objects carried; accordingly, persons with a medical implant should be advised to carry as few other metal objects as possible.
3. Security guards are aware of the existence of medical implants and are sympathetic; however, for trips to far countries it may be advisable for the patient to carry a note from the general practitioner or specialist.

Lumbar closed wedge osteotomy with partial corporectomy and transpedicular fixation in ankylopoietic spondylitis

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Introduction: Monosegmental open-wedge osteotomy according to Smith-Petersen, as performed in patients with a progressive thoracolumbar kyphosis due to ankylopoietic spondylitis, entails numerous complications and mortality rates up to 10%. Zielke described the multisegmental osteotomy of the spinal column with transpedicular fixation, frequently resulting in a monosegmental interspinal wedge.

Material and method: In order to avoid the above-named complications, a closed lumbar wedge osteotomy was carried out with partial resection of the body of L4 and transpedicular fixation from L3 to the sacrum. During the period from January 1990 through December 1993, 22 patients, with a mean age of 48 (27–70) years, were operated upon according to this method.

Results: The mean correction achieved amounted to 32° (24°–52°), the subsequent postoperative loss of correction amounted to 2.7° (0°–13°). The mean duration of the operation was 185 (135–240) minutes; mean blood loss was 2500 (1200–5000) mL. The osteotomy resulted in adequate correction in all patients; no fatal complications occurred. In two patients, loosening was observed at the site of the screw-rod connection of the fixation system. One patient

was subjected to re-exploration because of a neuropraxy. The osteosynthesis material was removed in two patients because of deep wound infections. The operations were complicated in six patients by superficial skin infections. After introduction of postoperative posture changing in a circular bed, this complication was no longer observed.

Conclusion: The technique described is relatively safe, predictable and independent of the patient's age or the stage of the condition. The large area of bone contact results in rapid consolidation of the osteotomy.

Metallic artefacts in MRI of the spinal column after cervical and lumbar spondylolysis without instrumentation

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Introduction: Magnetic resonance imaging (MRI) is the examination of first choice in the postoperative investigation of the spinal column and neural structures.

Metallic artefacts are frequently seen in the surgical field, without metallic implants being present.

The objective of this study was to investigate the occurrence and the significance of these artefacts retrospectively, and to attempt to reproduce artefacts in an experimental setup.

Material and method: Forty postoperative MRI scans of the spinal column were studied together with the operation reports. Three porcine femora were fitted with metal implants, following which MRI scans and standard radiographs were made.

Results: Metallic artefacts were observed in 36 of the 40 postoperative MRI scans, 6 with demonstrable presence of metal and 30 without presence of metal. Signal loss was highest after monosegmental ventral intercorporeal cervical spondylolysis and on the flash 2-D sequence.

During the intercorporeal spondylolysis operations, use was made at the cervical level of distraction by means of Kirschner wires fixed in the corpora, while at the lumbar level, Steinmann pins were used for this purpose.

During dorsal cervical spondylolyses, a high-speed fraise was always used. After dorsal lumbar spondylolysis the MRI as a rule was only done after the metal implants had been removed again.

During MRI scanning of the three porcine femora, a metallic artefact could be brought about without metal parts being demonstrable on the conventional radiography.

Conclusion: The literature contains sporadic reports of metallic artefacts during postoperative MRI examination of the spinal column without presence of metal. Presence of metal particles from surgical instruments might explain the existence of these artefacts.

This retrospective study confirms the occurrence of

metallic artefacts at MRI after cervical and lumbar spondylotheses.

In order to maintain the value of postoperative MRI examination of the spinal column after spondylothesis, it will be necessary to use instruments that leave few metallic microparticles behind. Also, use of fixation systems made of titanium is to be preferred. The radiodiagnostician can then limit the loss of signal by adjustment of the MRI sequences.

Treatment of retropatellar pain with a knee bandage—a prospective study in 100 patients

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Introduction: Retropatellar pain is one of the most frequent and least well understood symptoms in orthopedic practice. After exclusion of specific causes (arthrosis, patellar apicitis, osteochondritis, plicae, etc.), the term of idiopathic anterior knee pain (IAKP) becomes applicable. Comparison of the natural course of such symptoms with the results of various surgical treatments as performed in the past should in our opinion lead to the conclusion that the only justifiable treatment of this condition is conservative.

Objective of the study: A prospective study was organized to determine the effect of a simple knee bandage (GenurainR, Bauerfeind, Haarlem) on the symptoms of IAKP patients.

Patients and method: One hundred IAKP patients were treated with a Genurain®. They met the following five criteria: 1) age 8–40 years; 2) no earlier operations of the knee involved; 3) no objectively demonstrable abnormalities at orthopedic and roentgenological examination; 4) no improvement after at least 12 weeks' isometric quadriceps training under the guidance of a physiotherapist; 5) normal appearance of the cartilage at arthroscopy.

Treatment with the brace, started at least 3 months after arthroscopy, lasted a minimum of 12 weeks. Use was made of simple knee score forms which were completed after 6, 12 and 26 weeks, followed by an enquiry by telephone after 52 weeks.

Results: Attenuation of the pain was achieved in 44 patients and functional improvement in 42. Seven patients discontinued the treatment prematurely; three because they were unable to tolerate the brace and four because of aggravation of the pain. After one year, 22 patients were enthusiastic, 20 were satisfied, 50 noticed no clear improvement and eight patients were dissatisfied.

Conclusion: Treatment of IAKP with a knee bandage (Genurain®) resulted in distinct attenuation or even disappearance of the symptoms in almost 50% of 100 patients. In cases of chronic pain behind the patella without a specific cause, prescription of a knee bandage may be useful. A pros-

pective investigation into the use of a knee bandage and the natural evolution in IAKP is to be recommended.

Results of treatment with a corrective plaster corset in 60 patients with idiopathic scoliosis

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Introduction: The effect of plaster correction on a rigid scoliosis is insufficiently known.

Material and method: A retrospective study was carried out of the clinical and roentgenological data concerning 60 patients (54 girls and 6 boys, mean age 14 years) with idiopathic scoliosis treated during the period 1980–1991 with a plaster corset which was applied after correction on the Risser table.

All cases involved a rigid curvature, for which brace treatment had failed or proved impossible. The intention of the plaster treatment was to alter the character and degree of the curvature to such an extent that brace treatment might still be feasible. There were 24 cases of a single curvature, affecting the thoracic area (ET) 15 times, the thoracolumbar tract (ETL) twice and the lumbar tract (EL) seven times. Thirty-six patients had a double curvature, affecting the thoracic spine (DT) in six cases and the thoracolumbar spine (DTL) in 30 cases. The curvatures were measured according to the Cobb method 1) standing erect before the plaster period, 2) during the correction on the Risser table, 3) erect with the corset, 4) after the corset period and 5) after the total conservative treatment. The period in the plaster cast lasted an average of 23 weeks, the mean duration of the follow-up was 5.8 (1.6–13.3) years.

The table below lists the mean values obtained:

	1	2	3	4	5
ET	38°	16°	26°	36°	44°
ETL	33°	15°	17°	21°	28°
EL	46°	22°	31°	43°	53°
DT	31/42°	19/19°	27/28°	30/37°	36/45°
DTL	39/34°	17/14°	26/22°	35/32°	41/37°

Calculated according to the nomogram of Lonstein et al. (1984), the incidence of progression of the curvature in the group as a whole was 88%. After the conservative treatment, progression was observed in only 62% of the cases.

In 13 cases (mean progression incidence 98%), the plaster treatment had to be followed by surgery, in spite of the fact that the plaster treatment on average had been continued longer in this group (34 instead of 20 weeks). Plaster periods in excess of 26 weeks did not lead to any better results.

Conclusions: Preservation of the correction achieved with a plaster corset was only partially possible. After the

plaster period, the curvature is minimally reduced, but better accessible to further brace treatment, which in addition reduces the incidence of the progression.

The 'froac trial'—low molecular heparin (LMWH) versus oral anticoagulants (OAC) for prevention of deep venous thrombosis (DVT) in elective hip and knee prosthesis implantations

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Introduction: After total hip or knee substitution without prophylaxis, there is a pronounced risk of deep venous thrombosis in the lower leg and/or the thigh. The percentages reported in the literature range up to about 50 for hip replacement, and even higher for knee arthroplasty.

In the Netherlands, since consensus meetings and studies by Swierstra, prophylaxis with oral anticoagulants is nowadays the standard treatment.

However, the introduction of the low-molecular heparins meant a possibly attractive alternative.

Material and method: The efficacy and safety of these two forms of prophylaxis were compared by means of a multicenter prospective randomized study carried out in 12 orthopedic clinics. The low-molecular fraxiparin was administered subcutaneously, in doses depending on the body weight. The oral anticoagulants (Sintrom-mitis) were given in such dosages that a TT value of 10% (INR 2-3) was reached. Both prophylactic schedules were started preoperatively; after 10 ± 2 days evaluation was carried out by means of bilateral phlebography.

Prophylaxis in both groups was continued until three months after the operation with Sintrom-mitis (Ciba-Geigy BV, Arnhem). Primary end points were deep venous thrombosis (DVT) on the phlebogram and major hemorrhagic complications. The analyses were performed on the basis of the intention to treat, the evaluation of all data was performed by an independent committee and research bureau.

Results: Out of 517 successive patients with phlebograms suitable for interpretation (mean age 67.5 years), 391 had been subjected to hip replacement and 126 to a knee prosthesis operation.

DVT was established in 43 (16.5%) of the 260 patients in the LMWH group and in 50 (19.5%) of the 257 patients in the OAC group. The slight difference ($p=0.45$) of 2.9% to the advantage of LMWH was not significant. Pulmonary embolism was not observed in either group.

Clinically significant hemorrhages occurred in five patients (1.5%) of the 330 patients treated with LMWH and

in eight (2.3%) of the 342 patients with OAC ($p=0.62$). Here again, therefore, there was a slight difference in incidence to the advantage of the LMWH group, of 0.8%. The hemorrhagic complications were recorded in the entire group of patients, including those who had not had phlebography or in whom this examination had been unsuccessful.

Conclusion: A fixed dose of subcutaneous LMWH is at least as efficacious and safe as oral anticoagulants for the prophylaxis of DVT after hip and knee prosthesis operations.

What deformities of the radius may cause a limitation of rotation? An experimental-anatomical study

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Introduction: Posttraumatic abnormalities in the forearm frequently lead to disorders of rotation. The causes of these disorders are not always clear. Change of shape of the radius is probably one of the principal causative factors. The complex shape of the radius renders it difficult to give an exact description of rotatory deformation of the forearm.

Material and method: Various deformities were brought about in 10 osseo-ligamentous human cadaver preparations of the forearm, with complete carpal articulation and intact proximal and distal radio-ulnar articulations, using an external fixation system after osteotomy of the radius. In eight of the arms, the osteotomies were carried out at the site of the maximal radial curve (MRC), in one arm in the proximal third and in one arm in the distal third of the radius. Rotations were measured by the standardized method.

Results: The findings in the group of eight arms with an osteotomy at the site of the MRC show that in this group the maximal changes in rotations occurred after reduction of the MRC in combination with dorsal or volar angulation.

After proximal osteotomy of the radius, the loss of supination was maximal in case of reduction of the MRC in combination with dorsal angulation, while pronation remained unchanged. Distal osteotomy resulted in loss of pronation after reduction of the MRC in combination with dorsal angulation.

Conclusion: Loss of the radial curve in combination with dorsal or volar angulation may lead to major disorders of rotation. Consequently, improvement of rotations may be expected in patients with such posttraumatic deformities if correction can be achieved by means of an osteotomy.