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HIP

Migration of the femoral component after cemented hip revision arthroplasty using impacted morselized allograft evaluated by RSA

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RSA studies have been shown to be capable of predicting later loosening of hip prostheses. One of the major problems in revision joint surgery is decreased longevity and increased health care costs. Therefore it is important to look more detailed at prosthetic migration after revision. The purpose of the present study was to compare migration of the femoral component after hip revision using impacted bone grafting technique with those of primary cemented stems.

Material and methods: 26 consecutive patients were included in the study. Half of the patients had a primary cemented total hip arthroplasty (THA) and the other half had a revision THA using compacted bone grafting. The prosthesis used was a collarless, polished, double tapered stem (Exeter). The femoral components were prepared for roentgen stereophotogrammetric analysis (RSA) by tantalum markers. Radiographs were obtained postoperatively, and at 3, 6, and 12 months for assessment of migration of the femoral component using RSA. Ten patients were excluded because of technical errors with RSA. Thus, 16 patients (6 primaries and 10 revisions) were followed. All but two were operated on by the first author. Mean age was 63 (49–86) years in the primary group and 53 (41–80) in the revision group.

Results: All femoral components had migrated at 3 months. Continuos migration was observed from 3 to 6 months in the revised group, whereas the primaries had stabilized at 3 months. At all time periods, the difference in migration (MTPM) was significantly greater ($p < 0.05$) in the revised group. Other parameters from RSA (translation in X, Y and Z direction) showed the same significant differences. Maximum subsidence (Y-translation) was 1 mm in the primary group and 4 mm in the revised group. Harris hip score was superior in the primary group.

Discussion: The results from the present study suggest that a revised femoral component is more unstable and continues to migrate to a larger extent than the primary THA. An interesting finding was that migration of the revised prostheses seemed to stop at 6 months which is in contrast to similar studies from Sweden where revised femoral components continued to migrate up to 18 months. An increased longevity of the revised prostheses in the present study might be expected due to the early stabilization.

Uncemented revision of the femoral component combined with impacted allografting

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Short-term results after uncemented revision of the femoral component combined with impacted allografting are evaluated.

Material: 308 revisions were performed from Marts 1991 to January 1998, 152 males and 156 female with an average age of 68 years. The major cause of revision was aseptic loosening (243) and deep infection (37). 235 revisions were first revisions, 52 second revisions and 21 third or more revisions. Bone damage was graded according to Eng: 49 revisions were grade 1, 129 grade 2 and 130 grade 3. Impaction allografting was performed in all cases.

Results: Complications: 29 intraoperative fractures of the femoral shaft needed stabilization. Postoperative dislocation occurred in 12 cases.

Re-revisions: The total number of re-revisions was 27/308 (8,7 per cent), 10 (3,2 per cent) because of aseptic loosening of the revised femoral component, 9 because of deep infection, 5 because of recurrent dislocations, 2 because of loosening of the acetabular component and 1 because of persistent thigh pain.

Clinical and radiographic results: 66 patients followed for more than four years were evaluated. Average time to follow-up was 58 months. 46/66 patients were without pain, 18 had slight or moderate pain and 2 severe pain. There was no

subsidence of the revised femoral component in 57/66 cases. 6/9 subsided componts stabilized within 24 months, and there were thereafter no signs of loosening. In 3 cases the subsidence occurred gradually over the observation period and in 1 of these cases the component was considered loose. Radiographs at follow-up showed trabecular remodeling in 45 cases, cortical repair in 28 cases and both in 25 cases.

Conclusion: We find these short-term results satisfying and the continuos use of this technique in revision of the femoral component justified.

Boneloc cemented hip-replacements—a follow-up study

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Follow-up results 5-8 years after Boneloc cemented hip-replacements

Material and methods: In the period from 1.1.1991 to 4.8.1993 Boneloc Cement was used for fixation of the femoral component of cemented hip-replacements in our department. We have registered these hip-replacements and the patients are seen regularly every 18 months in the outpatient department including radiographic examination.

Results: 174 hips in 169 patients were operated in this way. 38 patients died before the actual follow-up; none of these had known loosening of the hip. 39 hips (22%) were revised, median 37 (10-83) months postoperatively, due to loosening of the femoral component . Thus 97 hip-replacements were left for follow-up.

13 were loose according to the radiographic examinations, of which 4 were painless, 3 is waiting for revision, 3 had pain in the hip but reoperation was contraindicated for medical reasons and 3 had slight pain and did not want reoperation. Of the remaining 91 hips , 16 had some pain and 65 were painless.

Three different kinds of prostheses were used. The first 9 months the Taperloc was used exclusively in 51 hips and thereafter a Bimetric prosthesis either with or without a collar 123 hips. 21 Taperloc prostheses (41%) and 19 Bimetric prostheses (14%) were later revised.

Conclusion: This study confirms that there is a high frequency of early loosening after Boneloc cemented hip arthroplasties especially in the beginning of the period. Patients without loosening have a satisfactory clinical outcome.

Charts have been reviewed and data registered concerning time from operation to either revision or sign of loosening, if the patient experienced pain from the operated hip and the type of femoral component used.

16 patients with 17 hip-replacements died before July 1995, further 16 patients with 16 operated hips died before follow-up.

Compaction of existing cancellous bone in the primary setting enhances implant fixation

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In previous work, we have shown that in situ compaction of existing cancellous bone in the primary setting with both cemented and uncemented femoral components was significantly more stable than conventional broaching, in vitro. In the present study we measured the biological response when the bone bed was prepared either with conventional methods (drilling), or with in situ compaction.

Materials and methods: Cylindrical plasma sprayed titanium implants (5.6 x 10 mm) were inserted into the distal femoral condyles in mature dogs. Compaction was achieved by sequential radial enlargement of the hole, from 4.4 mm expanded to 5.6 mm. Drilled holes were directly drilled to 5.6 mm. The implants were press-fit into each hole and loaded. The observation period was 2 and 4 weeks. Fixation was determined by push-out test. Data were analyzed with an Analysis of Variance, with categorical variables of treatment (drill, compaction), time (2, 4 weeks), condyle (medial, lateral), and $p < 0.05$.

Results: When pooling the data per categorical variable, there was no statistical difference between individual dogs, or between medial and lateral sides. There was a significant treatment effect (p 0.05), with mean fixation strength for compaction being higher than drilling (10.3 vs. 6.1 N/mm^2). There also was a significant time effect ($p < 0.05$), with mean fixation strength at four weeks being higher than two weeks (11.6 vs. 4.7 N/mm^2).

Conclusion: In situ compaction of existing cancellous bone was shown to increase the fixation of plasma sprayed titanium implants as compared to conventional drilling techniques, at two- and four-week time points, in this *in vivo* study of loaded implants. This may be due in part to an increased stability of the implant construct, as shown in our previous work, or may also be due to a local allografting effect, due to the compaction process. Because of these promising *in vivo* results at important early time points, longer term *in vivo* studies should be undertaken to continue to evaluate the compaction technique as a potential tool for improving implant survival and patient function.

Impaction grafting in cemented femoral revision —a 3–5 year follow-up of 19 cases with pre- or intraoperative femoral fractures

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This study deals with the treatment and outcome of femoral

revision in the presence of a periprosthetic fracture, where impaction grafting was needed to restore the bony structures.

Material and methods: During 1992 to 1995, total 90 hips were operated with the impaction grafting technique using the Exeter stem. 19 hips had a femoral fracture mostly with large osteolysis and severe cortical defects. The median age at the fracture was 75 (41–89) years. 2 hips earlier had each 4 revisions, 5 hips one revision. 9 fractures appeared preoperative, and 10 during surgery. 3 cases were treated solely with mesh and cables, 2 cases with AO femoral plates, and the remaining 14 cases with meshes, cables and 3.5 mm AO reconstruction plates with unicortical screws.

Results: The median duration of the operation was 5.25 (4.25–8.50) hours, and the median bloodloss during surgery was 3100 (2100–5000) mL. 4 patients had died, 2 before the first follow-up. The preoperative Harris Hip Score (HHS) was median 25 (6–76). All hips improved in HHS to median 74 (22–96). One case had an early deep infection and was converted to a Girdlestone, and another case suffered a refracture 5 months after the primary operation, which healed after further one revision. Of those who showed up at the follow-up examination, all besides 2 scored their overall expression as satisfied or very satisfied.

Conclusion: The authors conclude that the introduced technique with meshes, cables and reconstruction plates is an effective method when treating severe femoral fractures around hip prostheses with osteolysis and cortical defects demanding impaction grafting.

A systematised hip fracture record

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The procurement of data for clinical studies is difficult using the traditional patient record due to the risk of collection bias. In the hip fracture record (HFR), data designed for clinical studies are integrated into the patient record. The purpose of making the HFR was to: 1) make a short standardized patient record easy in use, 2) categorize clinical data prospectively, 3) prevent double registration, and 4) collect data for a clinical database.

Material and methods: The HFR had a schematic structure and it was mainly made up of multiple-choice questions that were answered by the examining doctor/nurse. Blank spaces were left for notes and comments. The first hip fracture patient admitted daily to Bispebjerg Hospital between 15 April and 15 May 1998 was included. M/F-ratio: 6/22, mean age 83 (53–94) years.

Results: 70% of the patients did not require comments in the admission record beyond those especially asked for. 13% of the patients required a supplementary comment to the standard operation note. Except for the discharge data (70% filled in) the data intended for the database were obtained. The fracture types were distributed into 16 cervical (9 displaced), 5 pertrochanteric, 1 subtrochanteric and 4 avulsions of the trochanter major. The operations were distributed into 17 osteosynthesis, 4 hemialloplastics and 1 THA. Six patients were discharged to their homes (10 days in hospital), 8 to residential homes (6 days), 10 for rehabilitation (8 days). One patient died in hospital, 1 was in hospital for 2 hours and 2 were not discharged at the time of evaluation.

Conclusion: The HFR is a valuable instrument for documenting the patients' condition at admission and the clinical course during hospital stay, and useful as an instrument for data collection.

Preoperative determinants for the length of hospital stay after hip fractures

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The purpose was to identify preoperative determinants and estimate a prognostic model for the length of hospital stay after hip-fractures.

Material and methods: The preoperative status were prospectively recorded from each of 237 consecutive patients with hip-fractures, all operated in the Dept. of Orthopedics, Svendborg Hospital and all admitted to the hospital from their own home. The associations between the recorded variables and the length of hospital stay were estimated by the method of Cox-regression

Results: Trochanteric fractures, age beyond 80 years and 'unable to walk alone outdoors preoperative' were all determinants for a prolonged hospital stay. A prognosis for continuing hospitalization beyond 2, 4 and 8 weeks for the different groups are described in the table.

Fracture	Age	Able to walk alone outdoors preopr.	>2 wks	>4 wks	>8 wks
Medial	< 80 years	+	48 %	3 %	0 %
		–	68%	17%	3%
	> 80 years	+	72%	18%	2%
		–	86%	43%	11%
Trochant.	< 80 years	+	71%	13%	2%
		–	82%	37%	9%
	> 80 years	+	81%	36%	8%
		–	92%	60%	31%

Conclusion: Fracture type, age and ability to walk preoperatively seems to be significant associated to the length of hospital stay after hip-fractures.

Hip arthroscopy

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The aim of this study was to evaluate the indication and results of hip arthroscopy

Material and methods: We have evaluated the results in 17 patients (8 men and 9 women), who have had a hip arthroscopy in the a period from 1989 to 1998. All the journals were seen and the indication, procedure, operative findings and the results at the final clinical examination was registered. The arthroscopy was performed under general anesthesia. The patient was placed in a supine position on a fracture table. A fluoroscope was used to confirm the position of the arthroscope. Arthroscopy was done with an anterolateral and a lateral portal.

Results: The indication was unexplained pain (14), locking (5), and impaired movement (4). In 3 patients a loose body was removed, in 2 patients an exostosis was resected, in 2 patients a partial tear of the labrum was resected and in one a large hematoma was evacuated. In 2 patients a chondral lesion was seen and 2 patients had arthrosis. In 5 patients the arthroscopy was normal. One complication was registered (lesion of the lateral cutaneous femoral nerve).

Conclusion: Removal of loose bodies represents the clearest indication for hip arthroscopy. In unresolved hip pain, hip arthroscopy can give more details of the intraarticular pathology.

Evaluation of suction drainage by ultrasound in intertrochanteric femoral fractures

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The use of closed suction drainage in orthopedic surgery to prevent the formation of hematomas is well known, but lacks evidence in the literature. We have used ultrasound to measure the actual size of the wound hematoma in 3D postoperative, and compared two groups of patients with intertrochanteric femoral fractures in a randomized controlled trial.

Material and methods: In a prospective blinded randomized study of 108 patients undergoing open reduction and internal fixation (ORIF) with a dynamic hip screw (DHS), the patients were allocated instantaneous postoperative to treatment with (group A) or without (group B) deep closed suction drainage. Patients allocated to group B had their drains removed immediately, while patients allocated to group A had their drains removed < 25 mL/d and at the latest day 4.

Ultrasound measures in 3D were done on day 5, and the cubic content of hematomas deep to the fascia were calculated using the formula of an ellipsoid. The allocation group was unknown to the investigator.

Results were statistically assessed using a data base.

Results: 81 patients were accessible for ultrasound examination. Of these, one patient were excluded because of a massive femoral hemorrhage resulting in two reoperations.

Median cubic content: Group A (n=40): 4.5 (0–54) cc,
Group B (n=40): 2.5 (0–38) cc
P = 0.18 (Mann-Whitney)
CI (0–4)

Conclusion: The routine use of suction drains to patients undergoing ORIF with DHS in intertrochanteric fractures, does not prevent or minimize postoperative wound hematoma, and is not recommended.

KNEE

Hydroxyapatite coating in total knee arthroplasty—a randomised RSA study of tibial components

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Experimental studies of hydroxyapatite coated implants have reported osteoconductive effect of hydroxyapatite (HA). The aim of this study was to evaluate the effect of HA-coating on tibial plateau migration in a randomized trial using tibial components with or without HA-coating.

Material and methods: We have prospectively randomly allocated 16 patients undergoing uncemented total knee arthroplasty to receive Interax (Howmedica) tibial components with or without HA-coating. The femoral components (also Interax) were all without HA-coating. The patients were 2 men and 14 women with a median age of 73 (57–82) years, and all were diagnosed as having primary osteoarthritis. The patients were allowed full weight bearing from the first postoperative day. RSA (Roentgen Stereophotogrammetric Analysis) investigations were performed within a week after the operation and after 3 and 6 months and each postoperative year.

Results: The results of the RSA investigations showed a lower MTPM in the HA-coated group than in the noncoated group after 3 and 6 months. After one year the MTPM was 0.67 ± 0.22 mm in the HA-coated group and 1.66 ± 0.60 mm in the non-HA-coated group ($p < 0.05$).

Discussion: Ryd et al. (1995) have also reported migrations of 1.7 mm after one year of noncemented tibial components. The migrations in the HA-coated group in this study are small and comparable to the migrations of cemented tibial components also given by Ryd et al. We have not observed cases of early loosening.

References:

Ryd L, Albrektsson B E, Carlsson L, Dansgard F, Herberts P, Lindstrand A, Regner L, and Toksvig Larsen S. Roentgen stereophotogrammetric analysis as a predictor of mechanical loosening of knee prostheses. J Bone Joint Surg (Br) 77: 377–383, 1995.

a) Part of a larger study: Longitudinal Measurements of Bone Mineral Density and Micromotion in Total Knee Arthroplasty. Rigshospitalet, Copenhagen, DK.

Patello-femoral pain syndrom—is muscle imbalance an essential ethiological factor?

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From the literature it is established, that chondromalacia patellae is caused by an increased pressure in the patello-femoral joint. According to this theory one could imagine, that chondromalacia patellae is caused by a too short and tight m. quadriceps. If this thesis is true, the symptoms will minimize if the patients can manage to make the muscle longer.

Material and methods: The patients aged below 41 years—53 in all—recorded from 1.9.96 to 1.9.97 at the department with the diagnoses chondromalacia patellae and morbi patellofemorales were attempted to be contacted and 50 were questioned in accordance to a questionnaire by phone. The patients treated with specific quadriceps stretching exercises (n = 8) had the length of m. quadriceps recorded using Thomas' test. This group were compared with a nihilistic (n = 18), an arthroscopic (n = 8), a physiotherapeutic (n = 7) group and a group with different treatments (n = 9).

Results: 8 of 11 patients made their stretching exercises. All patients had short m. quadriceps. Treatment with quadriceps stretching exercises significantly ($p = 0.008$) decreased the inconvenience. Six out of 8 patients were totally free of symptoms in mean 5 (1–12) weeks after initiating the exercises. They all claimed, that their m. Quadriceps were more flexible. Further more quadriceps strengthening exercises significantly ($p = 0.03$) worsened the symptoms. A diagnostic arthroscopy seemed to decrease the symptoms ($p = 0.06$).

Conclusion: This indirectly means, that the thesis about a short and tight muscle as an ethiological factor in the patello-femoral pain syndrom seems to be true. The only problem with the treatment seemed to be the cooperation of the patients.

Arthroscopic meniscus repair with meniscus arrow—a 2-year follow-up

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We have evaluated the healing results after introduction of Bionx Meniscus Arrow for arthroscopic repair of vertical, longitudinal meniscus lesions.

Material and methods: The 71 first consecutive arthroscopic meniscus repairs in 66 patients were evaluated. Male/female ratio: 40/26. Median age was 30 (18–52) years. 3 patients were lost to follow-up. Healing was judged on a combination of rearthroscopy (n=30) and clinical examination (n=33) at median 21 months after repair. 17 different surgeons performed the repairs.

Results: 56 of 68 repaired menisci were healed at rearthroscopy or did not give any symptoms on clinical examination. No complications of the repair method were found.

Conclusion: Meniscus repair with the Arrow is a simple, fast and safe procedure with healing results comparable to suture repair.

The medial patellofemoral ligament—a dissection study

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The medial patellofemoral ligament (MPFL) has in biomechanical studies been found to be the single most important restraint to lateral patellar translation and dislocation. An exact anatomical description is essential for surgical reconstruction of the MPFL following acute lateral dislocation of the patella.

Material and methods: From 21 specimen undergoing postmortem examination 39 knees without previous surgery were dissected. The MPFL and its relations was presented and measured. In 13 knees the MPFL was biopted.

Results: The MPFL originates at the adductor tubercle (AT), which is free of MPFL-fibres on the anterior 2–4 mm, and inserts on the superior part of the medial patella and the quadriceps tendon. In all patients the MPFL joined the undersurface of the vastus medialis obliquus (VMO) and the aponeurotic fibres of the vastus intermedius m. quadriceps femoris. The length of the MPFL was 5.3 (4.5–6.4) cm and the width just anterior to the AT was 1.9 (1.0–3.0) cm. From the AT to the VMO insertion the distance was 2.1 (0.7–2.8) cm. The distal edge of the MPFL was in 9 knees difficult to define. The proximal edge was visible and well presented in all knees. In all the biopted ligaments we found free nerve endings but no mechanoreceptors.

Conclusions: The MPFL was present and the proximal edge well and easily presented in all patients. Identification, testing and surgical repair of the MPFL, can be performed through an incision anterior to the MFE and along the distal edge of the VMO allowing proximal approach to the MPFL. No constant ratio between the MPFL length and the patella length or width was found.

Allografts in ligament surgery of the knee

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Since March 1998 we have been using allograft tissue for ligament reconstruction of the knee joint for selected patients.

Material and methods: Allograft tissue was harvested from multi-organ donors in co-operation with the center of organ transplantation (Rigshospitalet). Two calcaneal tendon grafts with boneblocks and two bone patella tendon bone grafts (BPTB) were harvested from each donor. The patella tendons were each divided into two grafts. Screening of the donors and storage of the ligaments were followed the recommendations for bone and tissue banks from the Danish National Health Authorities.

As of today we have performed 6 ligament reconstructions of the knee joint, all in men: 4 primary PCL-reconstructions with 3 calcaneal allograft tendons and 1 BPTB-allograft, 1 primary ACL-reconstruction and 1 re-reconstruction of the ACL with BPTB-allograft. Mean age of the patients was 29 (20–36) years.

Results: No intraoperative complications have been encountered and there has been no sign of postoperative allograft rejection. Postoperative rehabilitation program has been uncomplicated and successful for all the patients until now.

Conclusion: Early experience with ligament allograft reconstructions in the knee joint has been satisfactory and we will continue the use of allograft ligaments in selected patients.

Histological changes in sheep articular cartilage after meniscal allograft transplantation

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No previously studies have documented a preventive effect of meniscal allograft transplantation towards articular cartilage degeneration. The objective of this experimental sheep study was to examine the effect of medial meniscal allograft transplantation on the articular cartilage.

Material and methods: Both knees of 32 sheep were subjected to medial meniscal surgery. The knees had either meniscectomy (M6), primary transplantation (P6), secondary transplantation (S6), or sham operation (C6). Autopsy was performed 6 months postoperatively. Additional 6 sheep were meniscectomized (M3) and sham operated in the contralateral knee (C3), and these sheep were subjected to autopsy after 3 months. Four tissue blocks from the weight-bearing condylar surfaces, two form tibia and two from femur, were sampled for histological evaluation. Articular cartilage degeneration was scored accordingly to changes to structure, proteoglucan content, and cellularity. The examiner was blinded to the treatment. Knee score were average of the four samples. Knees with the most pronounced changes scored highest.

Results: Histological score (average (SD)) of P6 cartilage (4.66 (0.86)) was lower than M6 (6.46 (1.13); $p < 0.05$), but higher than C6 (2.53 (0.91); $p < 0.001$). There were no significant differences between S6 (5.91 (2.20)), M3 (5.83 (1.83)) and M6.

Conclusion: Medial meniscus allograft transplantation prevented short-term development of degenerative articular cartilage changes, but significant changes were present also in transplanted knees.

Do patients with ACL-rupture report the injury to insurance companies and to what is allocation of compensation correlated?

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There are no reported studies of the aspects of insurance and compensation in patients with ACL-rupture. The aim of this study was to investigate how many of the patients with ACL-rupture that report the injury and whether they receive compensation. Furthermore, to investigate to which factors allocation of compensation is correlated.

Material and methods: In the period 01.01.90-31.12.93 a total of 156 knee arthroscopies resulted in the diagnosis ACL-rupture. 156 patients were included in a retrospective *questionnaire-investigation. 118 patients, 74 male and 44 fe*male, answered the questionnaire. Median age was 28 (14–47) years

Results: 70% of patients reported the injury. Half of these, in comparison to only 8% of the non-reporters, received advice prior to reporting. 72% of non-reporters did not know they could apply for compensation, and 22% did not have an insurance. 71 % of the reporters received compensation and in 41% of these, ACL-reconstruction had been performed in comparison to 50% of those who got refusal. 42% of patients who were refused compensation, had reported prior to arthroscopy but only 24% of those who received compensation reported before the arthroscopy.

Conclusion: It is unsatisfying that only 16% of patients with ACL-rupture receives medical advices about reporting. Allocation of compensation did not seem to depend of whether ACL-construction was performed or not. Likelihood of compensation seemed biggest, when reporting took place after arthroscopy.

SHOULDER

Reduction of anterior dislocation of the shoulder joint—a new method

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Reduction of anterior dislocation of the shoulder joint has during the years been performed in many different ways, all of which require some sort of medication in order to make the patient sufficiently relaxed. A method in which no medication is needed is presented.

Material and methods: All patients admitted to the A and E department, Hvidovre Hospital from 1st of January 1998 have been included. A written instruction was passed out to all doctors at the department of orthopaedic surgery, explaining how to perform the reduction of anterior dislocation of the shoulder joint by the Hvidovre method. The patient has to be able to stand upright and to lean forward. With the patient in this position the dislocated shoulder can easily be reduced.

Results: Until end of August 1998, 25 patients have been included. In 20 of these the new method has proved to be successful. In 5 patients we were unable to reduce the dislocation by the Hvidovre method, as these patients for some reason were unable to cooperate.

Discussion: After reduction of an anterior dislocation of the shoulder joint in a traditional way one often has the problem, that the patient is affected by the medicine to such an extent that it is impossible to send him home directly from the A and E department. The new method is a great advantage as no medication is needed. Furthermore, patients with recurrent dislocation of the shoulder joint expressed that they found our method much more gentle.

Diagnostic radiographic evaluation of osseous lesions after traumatic primary anterior shoulder dislocation

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Our aim was to evaluate the diagnostic value of standard and special radiographic examination of osseous lesion after traumatic primary anterior shoulder dislocation (TPASD).

Material and methods: 76 patients, average age 22 (16–32) were included in a prospective study. Criteria of inclusion were TPASD, age between 15 and 39 years, radiographically confirmation of the dislocation and arthroscopic examination. Standard AP and lateral radiographs were taken initially after the trauma and special radiographs (West Point View) with 45° cranio-caudal projection were preformed before arthroscopic examination.

Results:

Standard radiographs	Arthroscopy			
	Hill Sachs		Osseous Bankart	
	No	Yes	No	Yes
No Hill Sachs	18	0		
Hill Sachs	54	4		
No osseous Bankart			69	1
Osseous Bankart			6	0

West point view	Arthroscopy			
	Hill Sachs		Osseous Bankart	
	No	Yes	No	Yes
No Hill Sachs	17	1		
Hill Sachs	39	19		
No osseous Bankart			69	0
Osseous Bankart			2	5

	Standard radiographs		West point view	
	Hill Sachs		Osseous Bankart	
	No	Yes	No	Yes
Sensitivity	0.07	0	0.33	0.71
Specificity	1.00	0.99	0.94	1.00
Accuracy	0.29	0.91	0.47	0.97

Conclusion: Standard AP- and lateral radiographic examination has a very low diagnostic sensitivity for osseous lesions, whereas the West point view increases diagnostic sensitivity. These findings do not favor routine standard or West Point radiographic views in order to detect osseous Bankart and Hill Sachs lesions after TPASD.

Reduction of anterior shoulder dislocation with external rotation

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The aim of the study was to evaluate External Rotation versus Kocher's maneuver in the treatment of shoulder dislocations, concerning successful reduction, experience of pain and satisfaction with the reduction.

Material and methods: Patients with primary or secondary traumatic anterior dislocation of the shoulder were included and randomized to either reduction with External rotation or Kocher's maneuver. 15 minutes before reduction 20 mL of 1% lidocaine was injected intraarticulary.

Patients with fractures of the humerus, age below 15, had to be admitted to Hospital or did not want to participate were excluded.

External rotation: The patient is supine. The elbow is flexed to 90°. Slow external rotation is carried out without longitudinal traction. The external rotation is carried out ex-

tremely slowly and without any significant force. The arm is rotated until 90°, and reduction usually occurs imperceptibly.

Kocher's maneuver: The elbow is flexed to 90° and steady traction is applied, the humerus is rotated externally to 30°, the arm i adducted and the arm is rotated medially so the hand falls across the opposite shoulder.

Results: After 18 months 134 patients were admitted to our departments. 113 patients were included. In the external rotation group 50 out of 55 shoulders were reduced successfully. In the Kocher group it was 50 out of 58. The patients were very satisfied in 45 cases in the external rotation group with an average VAS score at 3.05 and 36 cases in the Kocher group with an VAS score at 3.37.

Conclusion: External rotation is a simple and atraumatic method of reduction of anterior shoulder dislocations. It is as successful as Kocher's maneuver, but far more atraumatic, and is recommended to be used as first choice.

Reoperations for subacromial pain syndromes

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The aim of this study was to analyze causes for failure of the primary operative procedure and evaluate the results after reoperations for subacromial pain syndromes. Reoperations for failed rotator cuff repair were not included.

Materials and methods: From 1993 through 1997, 23 patients (24 shoulders) were reoperated for subacromial pain syndromes: 13 men and 10 women, average age 48 (37–60) years. Based on preoperative clinical and radiographic evaluation the primary decompression was thought to be insufficient in 14 shoulders, 5 patients had symptomatic AC arthritis, and in 2 partial or total cuff ruptures were suspected. In 3 patients a second look procedure was planned.

Results: Reoperations included 15 re-decompressions (including 3 AC resections), 4 AC resections. In 5 shoulders only a debridement was performed. All were arthroscopic procedures except 3 AC resections. Overall the results were satisfactory in only 50% of cases. 12 patients (13 shoulders) had workers compensation claims (WCC) or had applied for a pension. In this group only 2 patients had an acceptable outcome. There were 11 non-WCC patients and in this group 10 patients obtained a good result. In the WCC group 9 of 12 patients had very and three moderately shoulder demanding work and at follow-up (median 12, range 6–24 months) none of these patients had been able to return to their previous occupation. In the non-WCC group only 4 of 11 patients had shoulder demanding work and all patients were able to return to work.

Conclusions: Patients without workers compensation, insurance or pension claims, who do not have shoulder demanding work and where there are identifiable causes for failure of the primary procedure are much more likely to benefit from reoperation for subacromial pain syndrome than patients without these factors.

HAND/ELBOW

Time off work after occupational hand injuries

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The study analyzed the impact of several factors on start and duration of time off work among patients with occupational hand injuries, in order to identify prognostic indicators and assess the relative importance of factors which the doctor can influence during treatment.

Material and method: 802 consecutive hand patients treated in the emergency dept. of Odense University Hospital were included. The associations between time off work and diagnosis, age, gender, work and social factors, impairment of the injury, psychological-, guidance- and other factors were estimated multivariately.

Results: The study showed that work and social factors seems to have lesser influence on time off work than expected, whereas advice from doctors, flashback and impairment symptoms were important determinants.

Conclusion: Factors which can be influenced by doctors during treatment are significant associated to time off work after occupational hand injuries.

The prevalence of arthroscopic wrist surgery and endoscopic operations of carpal tunnel syndrome in Denmark

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The aim of this study is to estimate the extent of the actual utilization of arthroscopic wrist surgery and endoscopic operations of carpal tunnel syndrome in Denmark

Material and methods: A questionnaire was worked out and sent to each department of orthopaedics in Denmark (45 in all).

We asked about the following: a) Whether the hospital actually perform arthroscopic wrist surgery and endoscopic operations of carpal tunnel syndrome or not b) in case of performing these techniques then with which indications and how many they perform a year c) in case of not performing these techniques then what are the reasons.

Results: 41 of the hospitals answered the questionnaire (91%). Of the 41 departments of orthopedics, 46.5% does actually perform arthroscopic wrist surgery. TFC and ligaments lesions, chronic wrist pain, synovitis and treatment of intraarticular fractures were the most common indications among a great variety of indications. 53% of the hospitals do not perform arthroscopic wrist surgery at all. The reasons are lack of equipment (54.5%), lack of professionals for this purpose (45.5%) and insufficient knowledge about the tech-

nique (59%). Only 19.5% perform endoscopic operations of carpal tunnel syndrome and the remaining (80.5%) do not. The reasons are lack of professionals (43%), lack of equipment (37%) and not finding a relevant indication (43%).

Conclusion: It could be questioned whether an operation as technically demanding as arthroscopy should be performed in departments that perform only 1–2 a year.

A practical approach to distal antebrachial fracture reduction

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Until 1995 we used a towel held by a nurse to stabilize the elbow while reducing distal antebrachial fractures. As several nurses complained of shoulder pain during the procedure, I developed an elbow holder to tie the patients elbow to the couch.

Materials and methods: The elbow holder is made of cloth and 25 cm Velcro strap. It is designed to follow the contours of an elbow in 90° flexion. It has a banana shape on the part in contact with the arm to avoid pressure marks. It is wrapped around the humerus with 4 bands attached used for tying to the couch, and fixed around the antebrachium with Velcro straps. To avoid pressure, a pair of sponges are placed between the elbow holder and the elbow before fracture reduction. Appliance time of the elbow holder is 2–5 minutes. When applied on the elbow, a distal antebrachial fracture can be reduced by the usual methods. After reduction the Velcro straps are released, while the fracture is held in place, and a plaster cast applied.

Results: The elbow holder has replaced the nurse as a counterholder in reduction of distal antebrachium fractures. It gives a stable counterhold, and is not unpleasant to the patient.

Conclusion: An elbow holder is an inexpensive, practical device in reduction of distal antebrachial fractures.

Madelung deformity treated with radial osteotomy and external fixation for correction and lengthening a.m. Ilizarov

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In this case report a female patient with bilateral Madelung deformity corrected with Ilizarov technique on the left side is reviewed.

Material and methods: From the age of 11 the girl complained of pain and reduced forearm-rotation in her left wrist, which restricted her from sports activities and required frequent use of analgesics. Over a 4-year period radiographs of the left wrist showed deterioration in the deformity. After closure of the radial and ulnar epiphysis at the age of 15, osteotomy on the left distal radius and external fixation a.m. Ilizarov was carried out, with simultaneous lengthening and correction of the volar and ulnar angle of the distal radius. At the end of the procedure after 9 weeks, there was full regeneration of the bone in the distracted area.

Results: Radiographically the volar angulation and the ulnar tilt of the distal radius were corrected. In the distal radioulnar joint dorsal subluxation was not totally reduced but the patient is pain free. 10 months after removal of the Ilizarov-apparatus forearm rotation has improved in supination with 45°. Pronation and flexion of the wrist was normal, but a 30° lack of extension developed. As the only complication a superficial pin infection successfully treated with oral antibiotics was seen. The patient is very satisfied with the result and has no restrictions in daily life.

Conclusion: The Ilizarov technique should be considered when surgical treatment of Madelung deformity is indicated after closure of the epiphysis and when a large angle of correction is needed.

Complications and re-operation rate after tension band wiring of olecranon fractures

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Olecranon fractures have routinely been treated by ORIF with the tension band wire technique. To asses the complication and re-operation rate, a retrospective study was performed on patients operated on between 1/1 1994 and 31/5 1997.

Material and methods: 55 patients were operated on. Median age was 69 (18–91) years. Median follow up of 46 patients was 8.5 (1–48) months. 4 patients had died, 2 were from overseas and 3 were lost to follow up for other reasons.

Results: 2 cases needed to be re-done due to unacceptable displacement. 1 of them got infected afterwards. 3 skin perforations by K-wires and 3 delayed unions were encountered. No ulnar nerve problems were found.

Overall re-operation rate was 72%. Removal of metal ware was needed in 31 patients (67%). The main reason for removal was a direct complaint from the patient defined as bothered by the metal ware. 19 out of 20 patients who made this complaint had their metal ware removed.

Conclusions: Tension band wire technique in olecranon fractures yields reliable results in terms of fixation and healing. However, the high rate of removal of metal ware may justify the introduction of other methods of fixation.

MISCELLANEOUS

Differential response to OP-1 in primary and revision implants

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Revision joint replacement implants have shorter longevity, poorer functional outcome, higher costs, and longer rehabilitation times than primary implants. Improving the integrity and durability of the impaired interface in revisions can be expected to promote better long-term implant survival. The role of bone morphogenetic proteins (BMP's) that influence bone formation and resorption, has not been studied in a revision setting.

Materials and methods: A previously established controlled model of primary and revision implants in the canine knee was used. This model produces a characteristic periprosthetic tissue reaction for revision implants, consisting of dense fibrous tissue with synovial-like lining cells, macrophages with ingested particulate polyethylene (PE), and a sclerotic neocortex. The revision setting is engendered with a 6.0 mm smooth PMMA cylinder pistoning 500 mm in the medial femoral condyles for 8 weeks, in the presence of PE (0.5–50 mm; 0.5 x 108; 85% < 12 mm). At eight weeks, 6.0 mm plasma sprayed Ti implants were inserted into the cleaned, scraped and lavaged revision cavity (revision condition), and into the contralateral knee in a newly drilled primary cavity (primary condition). Morselized allograft was tightly compacked around each implant. Treatment groups were primary and revision grafted implants, at two doses of OP-1 (40 and 80 mg, mixed with the allograft); the control groups are the identical stable primary and revision implants, with allograft, but without OP-1 (6 groups, 48 implants; 8 implants per group). Implant fixation was evaluated by push-out test.

Results: At the 4-week retrieval time point, interfacial shear strength in the primary bone-grafted implant was significantly reduced ($p < 0.05$) with both doses of OP-1, as compared to bone-graft alone. In contrast, the interfacial shear strength in the revision bone-grafted implant was increased when mixed with OP-1, significantly for the 40 mg OP-1/implant dose ($p < 0.05$).

Conclusion: The addition of OP-1 to bone graft was beneficial at a 4 week time point in revision implants, but was detrimental at this same time point in primary implants. This is in contrast to our previous studies with revision implants, which showed that grafted hydroxyapatite coated implants, in a revision setting at this same 4 week time point, were able to increase fixation to that of grafted primary implants. Further studies to examine longer time points in both primaries and revisions, and potential synergy between hydroxyapatite and OP-1, are warranted.

Whiplash trauma—interview follow-up study after 4 years

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The aim of this retrospective interview study was to analyze the symptoms described by the patients after whiplash trauma of the neck, and to establish possible factors disposing to chronic whiplash syndrome.

Material and methods: From 1991 to 1993, 129 patients (77 female, 52 male) living in eastern Denmark consulted our emergency ward and had x-rays taken of the neck due to whiplash lesion. Median age was 35 (12–72) years. One patient had died at the time of follow-up. A questionnaire and invitation to a telephone interview was sent to 128 patients. Median 4.0 (2.7–6.9) years after the trauma 93 patients (57 female, 36 male) took part in an extensive phone interview, covering trauma mechanism, type, severity and duration of symptoms, socioeconomical effects and treatment. The number of patient contacts 1991– 1993 was compared to following years.

Results: The questionnaire was returned by 117 (91%) of the patients. 24 patients declined further interview, 11 of these did not describe significant symptoms after the whiplash trauma. 21 (23%) of the 93 interviewed patients did not have complaints for more than 2 weeks. 67 (72%) had symptoms for more than 6 months (chronic whiplash syndrome). Pain of the neck and headache were the predominant symptoms. Age was positively associated with the development of chronic whiplash syndrome. The annual number of emergency ward contacts due to whiplash trauma has increased from 1991 to 1997.

Conclusion: In this retrospective study based on 93 patient interviews, the majority of the patients had complaints for more than 2 weeks after whiplash trauma, with a considerable risk of developing chronic whiplash syndrome. Age seems to be a factor disposing to development of chronic whiplash syndrome. The number of patient contacts due to whiplash trauma has increased.

Patient satisfaction—the patient related model

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Patient satisfaction is now recognized by health care providers and regulators as a possible measure of health care quality. The Hand Surgery Department would like to introduce a new concept of patient satisfaction: 1) the continuative model, 2) the timesaving model, and 3) the patient related model.

Material and methods: We have developed a question-

naire designed to obtain the patient's evaluation of information, function of the hand before and after treatment, pain before and after treatment, whether they would choose the same treatment again if possible and waiting time during the treatment. The instrument was named 'patient related model'. The patient's had to fill out a questionnaire at the first visit and at the final visit. The doctor's scheme contains diagnosis, operations, complications and other competitive diseases.

If the patient's only have been seen once, they only have a scheme 1. If they had been seen in the emergency department first and shortly after concluded at the Hand Surgery Department, they only have a Scheme 2 (the final scheme).

Results: 1000 patient's were included in the data base over a period of 6 months. 80% had answered the questionnaire and 4.4% refused to participate. 734 patients were concluded after the first visit (only one scheme) and 142 patients had both a first scheme and a final scheme. In these groups it was possible to measure the changes in satisfaction with the information, the function of the hand and the expected function of the hand (primary hand profile).

Conclusion: A patient related model with a few questions filled out by the patients before and after treatment is a practical tool to measure continuously changes in patient satisfaction. It also shows that satisfaction is entirely relative, defined in large part by the perceived discrepancy between the patient's expectations and actual experience—patient related biased.

MR imaging of the symphysis in athletes with groin pain

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Groin pain in association with sports activities is well known in many sports and the diagnostic methods as well as the therapy are still far from clarified. We have studied the findings of MR imaging in athletes with groin pain.

Material and methods: 12 athletes were included. All were examined with a standardized clinical examination and 99m-technetium-DPD bone scintigraphy. MRI of the pelvis and symphysis was performed with standardized STIR-sequences.

Results: Based on the clinical examination 9 patients were classified as having adductor related pain, 2 as having iliopsoas related pain and 1 as a stress fracture in the rami of the pubic bone. MRI with STIR sequences showed increased signal intensity in the pubic bone on the clinically affected side in the patients with adductor related pain and in relation to the stress fracture. The 2 patients with iliopsoas related pain had no changes in the signal intensity of the pubic bone.

The MRI changes were located in the region of the tuberculum pubicum, but also in some cases extending into the ramus superior or the ramus inferior. The clinical finding of pain, increased signal on MRI and the increased uptake on bone scintigram all corresponded.

Conclusion: MR imaging seems useful in the differential diagnosis in difficult cases an in the search of the etiology of groin pain.

Treatment of bone and soft tissue defects with the Ilizarov technique

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Bone defects can result from trauma, infection, tumors or complication of prior surgery. With the distraction osteogenesis, G. A. Ilizarov introduced a fundamentally new approach to restore large bone defects.

Material and methods: 19 patients, 15 males and 4 females, median age 43 (10-61) years with tibia (17) and femur (2) defects were treated by internal bone transport. In 17 patients the defects were the result of trauma and prior surgeries, 2 patients had bone tumors. 13 patients had a history of infection and 8 were actively infected. The treatment included excision of pathological bone, metaphyseal corticotomy and application of the Ilizarov frame.

Results: Union and restoration of length and axis of the limb and eradication of infections was successful, followed by a good functional result in all but one patient with failed ankle arthrodesis. The median healing index was 1.02 (0.57–2.13) months per cm.

Complications: 9 cases had pin site infections. 2 patients needed re-osteotomy due to preliminary consolidation of the bone regenerate. 3 patients with healing problems at the docking site responded to autologous bone grafting. No patients had neurological or vascular problems.

Conclusion: Treatment of large bone defects must be considered as a limb saving, as well as a restorative procedure. The Ilizarov technique offers unique possibility for that and was the only possible treatment method for many of these patients. The treatment requires patience of both doctor and patients. We have noted a number of difficulties during the treatment, but few serious complications.

Congenital fibular hemimelia—description and treatment a.m. Ilizarov

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Congenital fibular hemimelia (CFH) is a rare but well described entity consisting of hypo/aplasia of the fibula with shortening and eventually malformation of the tibia. Associated are abnormalities of the ipsilateral foot, knee or femur. Seldomly CFH are bilateral or part of a syndrome. Management may be difficult in severe cases, and some centers still

recommend partial amputations and short leg prosthesis.

We describe a material of patients with CFH and present our results with correction of deformities and limb-lengthening, mainly using the Ilizarov technique.

Material and methods: We reviewed 21 patients (23 legs) with CFH seen at our department from January 1991 through June 1998. All concurrent abnormalities were registered and the degree of CFH was classified after Achtermann and Kalamchi. The treatment and complications were registered and the results evaluated.

Results: 17 legs with CFH were of type 1A/B (hypoplasia of fibula), while the remaining 6 were type II (agenesia of fibula). 17 legs were lengthened. 15 with Ilizarov, 2 of the earliest with Orthofix. Mean lengthening was 5 cm (3-8) at age 10 year (9 month-27 years). Foot position and tibial curvature was concomitantly corrected as needed. There was one failure. Complications were 2 eventlessly healing fractures and minor infection of pinholes.

Conclusion: Ilizarov frames seems to be promising in treating CFH. The treatment is complex and several operations might be necessary to correct shortening and malformations in severe cases. Low incidence (<10/100,000) probably calls for centralization of treatment.

Multidisciplinary in-depth analyses of 17 left-turn motor-vehicle accidents

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The Danish Road Accident Analysis Group consists of psychologists, road- and vehicle engineers, a police superintendent and a medical doctor. The group's objective is to conduct in-depth analyses of traffic accidents and recommend ways of preventing them.

Materials and methods: The study consisted of 17 prospective left-turn motor-vehicle accidents that occurred in 1997. The analyses were based on police reports, investigations of accident sites and vehicles, interviews with drivers, passengers and witnesses, hospital journals and AIS/ISS coding. The study is carried out independent of police and insurance investigations and all interviewees are guaranteed anonymity

Results: Accident factors: Human factors: inattention (8–9 accidents), excessive speeds (3–5), and misjudging distance and speed of oncoming vehicles (4). Uneven view up to junctions (3) and lack of a left-turn lane (2).

Injury factors: Lack of seat belt use (8). All these victims were men between 8–18.

Conclusions: The accidents caused by the drivers turning left were primarily due to attentive and judgmental errors, but none were due to hazardous driving. Elderly drivers are over represented in left-turn accidents.

Accident prevention: Simplify junctions with roundabouts and uniform visibility up to junctions. Inform elderly drivers of the particular problems they can encounter at junctions. Increase the perceived risk of being caught for speeding and enforce strict sanctions for violating speed limits.

Injury prevention: Encourage seat belt use and impose larger fines for lack of seat belt use.