1 MAGNETIC RESONANCE IMAGING FOR THE ROTATOR CUFF TEAR
Y. Morisawa, T. Sadahiro, Dept. of Orth., Surg., Kochi Prefectural Hata-Kenmin Hospital, Flec Clinic, Kochi, Japan

Magnetic resonance imaging (MRI) observation of the rotator cuff tear showing the high signal intensity on the supraspinatus muscle belly (SMB) was examined before and after surgery. The subjects were eleven patients with the massive and global rotator cuff tear of the shoulder aged 52–76 years (mean, 65.4 years). They were evaluated the pre- and post-operative signal intensity of the SMB on MRI. They showed no remarkable changes of the intensity. The persistent tear of the rotator cuff causes fibrosis and fatty degeneration in the SMB showed the high signal intensity on MRI through the post-operative periods.

2 EVALUATION OF THE MODIFIED BRISTOW PROCEDURE WITH OPEN MRI
Tomohisa Hashiuchi, Goro Sakurai, Jiro Ozaki, Koichi Imada, Dept of Orthop Surg, Nara Rehabilitation Center, Nara, Dept of Orthop Surg, Kurobe City Hospital, Toyama, Japan

Purpose: The purpose of this study is to evaluate the effect of the modified Bristow procedure in apprehension test position with open MRI.

Materials and Methods: A 31-year-old man had received modified Bristow procedure for recurrent anterior dislocation of the shoulder. MRI was performed with an open MRI in the apprehension test position.

Results: The humeral head pressed upon the conjoined tendon and the course of the conjoined tendon was antero-inferior are curve.

Conclusion: This study suggests that the conjoined tendon is an important role for preventing anterior dislocation of the shoulder.

3 A CASE OF SECONDARY GLENDHUMERAL OSTEOARTHRITIS AFTER RADIATION
Akinari Anemiya, Showa University, Yamanashi, Japan

Purpose: A case report.

Methods: The patient was 58-year-old woman who have history of breast cancer. The operation was performed in 1990 and radiation was followed. In 2000, there was glenohumeral osteoarthritis on her shoulder in X-ray.

Result: We operated total shoulder arthroplasty.

Conclusion: We thought cause of this case was glenohumeral osteoarthritis by osteoradionecrosis.

4 FRACTURE OF THE SCAPULA WITH INTRATHORACIC PENETRATION
R. Inasaka, MD, Y. Iwamura, MD, A. Enomoto, MD, S. Abe, MD, K. Kawai, MD, Dept of Orthopaedic Surgery, Yokohama Ekisaikai Hospital, Yokohama, Japan

A 26-year-old man was injured in a motorcycle accident. Plain radiographs revealed fractures of right ribs, clavicle and scapula. Computerized tomography of the chest revealed a thoracic penetration by the fractured scapula. An operation was performed. The scapular fracture fragment was stuck between fifth and sixth ribs. The main fragment of the scapula was fixed by AO reconstruction plate. Pain is not complained and range of motion of the shoulder is recovered full now. A fracture of the scapula with intrathoracic penetration was reported only once in our review of the literature.

5 A CASE OF MASSIVE ROTATOR CUFF TEAR TREATED BY LESS INVASIVE TRANSPOSITION OF INFRASPINATUS MUSCLE USING POSTERIOR SUBLDELTOID APPROACH
K. Sakai, MD, S. Kurado, MD. Dept of Orthopedic Surgery, Toyama Red Cross Hospital, Matsudo Orthopedic Hospital, Toyama, Japan

We report a case of massive rotator cuff tear treated by infraspinatus transposition by posterior subdeltoid approach. A 67 year old man could not abduct his right arm more than 30°. MRI showed massive rotator cuff tear and was too shortened to repair conventionally, therefore we shifted the infraspinatus by posterior subdeltoid approach not to detach the deltoid. Three months after the operation, he could elevate his shoulder over 150°. Transposition of the infraspinatus using posterior subdeltoid approach may be less invasive, less painful, and useful for massive cuff tear patients.

6 THE ANALYSIS OF ACROMIOCLAVICULAR JOINT MOTION AFTER WOLTER CLAVICULAR PLATE FIXATION: A CADVERIC STUDY
H. Goto, MD, F. Fujiyoshi, MD, H. Senda, MD, H. Muro, MD, S. Hisazaki, MD, M. Nozaki, MD, G. Sagara, MD, M. Haba, MD, K. Kato, MD, K. Sugimoto, MD, Dept of Orthopaedic Surgery, Ogaki Municipal Hospital, Dept of Orthopaedic Surgery, Midori Municipal Hospital, Gifu, Japan

In this study, five shoulders from three cadavers were used. Three models, which were control, dislocation (acromioclavicular and coracoacromial ligament were released), and fixation (fixed with Wolter clavicular plate) were established. The movements of acromion relative to distal clavicle were measured and expressed as changes in angle on both sagittal and horizontal plane. In the dislocation model, the motion of ACJ increased in flexion compared with the control model. In the fixation model, the motion of ACJ decreased in both flexion and abduction. This study indicated that the fixation by Wolter clavicular plate restricted the motion of acromioclavicular joint.
Adequate operative treatment for type II distal clavicle fractures, of whom had acromioclavicular pain. Wire migrations in 7 cases finally, and 5 excellent in 17 patients, good in one and poor in another patient. Union and one had non-union. At final follow-up, results were treated with tension-band wiring technique and were as- acquired. In the remaining 10 Type II cases, malunion occurred in 6 and porosis. We cannot recommend this method for elder patients with osteo-

Clinical results of conservation treatment for the twenty-three distal clavicle fractures (average age 46.1 years). According to Neer’s classification, 3 fractures were Type I, 17 Type II and 3 Type III. When the closed reduction was achieved, brace was applied. 3 Type II fractures were operated. Bone union was obtained all Type I and Type III cases, and 7 Type II cases including 3 operated cases achieved good bone union. However in the remaining 10 Type II cases, malunion occurred in 6 and nonunion in 4, there were few symptoms and no patients had disability.

Clinical results of A-C joint dislocation following plate fixation—Evaluated with the JSS Form. With the Japan Shoulder Society A-C Joint Dislocation Evaluation Form (JSS), the clinical outcomes of A-C joint dislocation treated with plate fixation were evaluated. And it compared with evaluation by the Japanese Orthopaedic Association Shoulder Joint Treatment Score (JOA). 18 patients, with a minimum of six months follow-up after plate removal, were evaluated. Postoperative evaluation was achieved in 87.9 points in JSS, and was 95.7 points in JOA. Postoperative evaluation was considered that the JSS is more suitable than JOA as a scoring system of A-C joint dislocation, because JOA scores in this group were much influenced by the glenohumeral joint condition.

We studied the effect of the critical path introduced into repair of rotator cuff tear. The subjects comprised 17 cases using the critical path excluding massive tears and 9 cases before introduc-

Conservative treatment for the distal clavicle fractures. S. Sakurado, MD, K. Tsobo, MD, M. Tanno, MD, Y. Yamamoto, MD, S. Aburakawa, MD, Dept of Orthop Surgery, Aomori City Hospital, Aomori, Dept of Orthop Surgery, Hirosaki Univ, Hirosaki, Japan

We evaluated clinical results of conservative treatment for the twenty-three distal clavicle fractures (average age 46.1 years). According to Neer’s classification, 3 fractures were Type I, 17 Type II and 3 Type III. When the closed reduction was achieved, brace was applied. 3 Type II fractures were operated. Bone union was obtained all Type I and Type III cases, and 7 Type II cases including 3 operated cases achieved good bone union. However in the remaining 10 Type II cases, malunion occurred in 6 and nonunion in 4, there were few symptoms and no patients had disability.

Critical path for repair of rotator cuff tears. Hirano Mako, Nomura Kazutoshi, Orthopaedic Department, Kumamoto National Hospital, Kumamoto City, Japan

We studied the effect of the critical path introduced into repair of rotator cuff tear. The subjects comprised 17 cases using the critical path excluding massive tears and 9 cases before introduc-

Contracture of the shoulders associated with rotator cuff tears: contracture types and clinical results. Komatsuda Tatsuro, Sato Katsumi, Narishige Takashi, Sone Shigeki, Kumagai Juno, Ishibashi Koji, Minoru Hashimoto, Department of Orthopaedic Surgery, Tohoku Rosai Hospital, Iwate Prefectural Central Hospital, Ishibashi Hospital, Department of Health and Welfare Science, Faculty of Physical Education, Sendai College, Sendai, Japan

Surgical results of rotator cuff tears which received brisement procedures for preoperative shoulder contractures were evaluated. According to the arthroscopic findings, there were two types of capsular injuries by brisement procedures. Type A (17 shoulders): tear of the axillary region, Type B (9 shoulders): tear of both axillar and rotator interval regions. The outcome was assessed with the JOA score. Postoperative shoulder functions improved significantly in both types. The improvement of range of motion in external rotation gained more in type B.

Significance of weakness of grip strength in rotator cuff tears. Y. Gotoh, N. Mura, M. Matsuda, Y. Momonoi, D. Tsuruta, T. Ogino. Dept of Orthopedic Surg, Municipal Sakata Hospital, Sakata, Yamagata, Japan

The materials for this study were 22 patients who had rotator cuff tear of the shoulder and were normal in the other shoulder. There were 14 males and 8 females with an average age of 58 years. Isometric muscle strength around the shoulders were measured by using a MicroFET, and grip strength was done by using a dynamometer. The ratios of the muscle strength of the affected side to the one of the normal side were calculated. Weakness of grip strength in the cuff tear side indicated a greater loss of muscle strength of 45 degrees shoulder abduction.
AN ISOLATED RUPTURE OF THE SUBSCAPULARIS TENDON
T. Mondori, MD, Y. Nakagawa, MD, M. Ogawa, MD Dept of Orthop Surg. Haibara General Hospital, Nara, Japan

Diagnosis of an isolated rupture of the subscapularis tendon is difficult because it is rare. The purpose of this study was to suppose the pathogenesis and to clarify the clinical features of this injury. This subject consisted of 16 cases confirmed by surgery. We obtained satisfactory results in almost all the patients. In conclusion an isolated subscapularis tendon rupture often involved the failure of LHB gliding mechanism. This injury should be treated operatively, because it was difficult to be treated conservatively.

INTRAOSSEOUS GANGLION OF THE GLENOID: A CASE REPORT
H. Shiozaki, MD, Y. Kon, MD, Dept of Orthop Surg, Saiseikai Niigata Daini Hospital, Niigata, Japan

We report a rare case of intraosseous ganglion of the glenoid. A 62-year-old man had left shoulder pain of 1 year’s duration. Plain radiographs and CT scans showed a multilocular cystic lesion in the subchondral area of the inferior glenoid. MRI demonstrated the lesion as a low intensity on T1-weighted images and a high intensity on T2-weighted images. Curetage of the cyst wall and gelatinous contents followed by bone graft was performed. Histologic examination showed fibrous tissue with myxoid change. The patient has full range of motion without symptoms 5 years after operation.

SUBACROMIAL BURSITIS WITH MULTIPLE RICE BODIES: REPORT OF TWO CASES OF RHEUMATOID ARTHRITIS
Y. Kon, MD, H. Shiozaki, MD, Dept of Orthopaedic Surgery, Saiseikai Niigata City Hospital, Niigata City, Japan

Chief complaints of both cases were swelling of the shoulder, limitation of ROM and motion pain. Subacromial bursography and MRI showed a markedly distended subacromial/subdeltoid bursa, filled with multiple loose bodies in both cases. Subacromial bursa was totally excised within multiple rice bodies. There was no recurrence after operation. Rice bodies probably evolve from degeneration and ischemia in a proliferative synovium, and grow with being covered with fibrin and/or collagen. Multiple rice bodies in subacromial bursa was caused by the mechanical stress, which was friction and high pressure in bursa related to the structure surrounding the subacromial joint space.

CLINICAL RESULTS OF OPERATIVE TREATMENTS FOR PARALYZED SHOULDERS FUNCTION
Tomoyuki Yamakawa MD, Toshiro Kake, MD, Naoki Ishijima MD, Kiyoshi Yasuda MD Dept of Orthop Surg, Mitsubishi Kyoto Hosp, Dept of Orthop Surg, Shizuoka General Hosp, Kyoto, Japan

Recently, we performed accessory nerve transfer to suprascapular nerve for restoration of the shoulder function in brachial plexus injury. In this study accessory nerve transfer was compared to multiple muscle transfer and arthrodesis in clinical results. Since 1993, eight patients were operated by multiple muscle transfer, four patients by arthrodesis, and nine patients by accessory nerve transfer to suprascapular nerve. Follow-up period was two years to five years. The patients of arthrodesis had more residual complaints. The external rotation angle of the shoulder improved especially after accessory nerve transfer.

FATIGUE OF THE SHOULDER MUSCULATURE BY EXTERNAL ROTATION EXERCISE: AN EMG STUDY
I. Wakabayashi, MD, E. Itoi, MD, T. Kido, MD, T. Shimizu, MD, M. Kobayashi, MD, Dept of Orthopedic Surgery, Akita University, Sch of Med, Dept of Orthopedic Surgery, Oguchi Central Hosp, Akita, Japan

We previously reported that muscle fatigue of the shoulder external rotators caused significant superior translation of the humeral head during the early phase of abduction. To quantitate the muscle fatigue, EMG activities of the anterior, middle, and posterior deltoid and infraspinatus were recorded in 11 normal shoulders. During the exercise, the decrease rate of the median power frequency of the infraspinatus was significantly greater than the deltoid. After muscle fatigue, %MVC of the infraspinatus decreased during arm elevation. The external rotation exercise causes specific muscle fatigue of the infraspinatus, which shows decreased activities during arm elevation.

CONSERVATIVE TREATMENT OF MASSIVE ROTATOR CUFF TEARS
H. Minagawa, MD, E. Itoi, MD, Dept of Orthop Surg, Akita Univ Sch of Med, Akita-ken, Japan

Between 1996 and 1999, 43 shoulders of 43 patients were diagnosed as massive rotator cuff tears by MRI. All patients were treated conservatively except 2 who underwent surgery. Among 41 shoulders treated conservatively for more than 12 months, 25 shoulders of 25 patients were followed up with an average follow-up period of 36 months. The shoulder functional evaluation by JOA score was used for assessment. The overall JOA score improved significantly (p < .01). Satisfactory results were obtained in 68%. At follow-up, 40% had no pain and 76% did not need any medication.

PREOPERATIVE THICKNESS OF THE SUPRASPINATUS MUSCLE WAS A FACTOR INFLUENCING RESULTS OF SURGERY FOR THE MASSIVE ROTATOR CUFF TEAR
Y. Hata, MD, S. Saitoh, MD, N. Murakami, MD, H. Kobayashi, MD, K. Takaoka, MD, Division of Rehabilitation Medicine, Shinsyu Univ Sch of Med, Dept of Physical Therapy, Shinsyu Univ Sch of Allied Medical Sciences, Dept of Orthop Surg, Shinsyu Univ Sch of Med, Nagano, Japan

Purpose: The purpose of this study was to investigate the factors in preoperative radiographs and MRI which would influence the results of surgery for the massive rotator cuff tear.

Materials and Methods: Radiographic and MRI studies were performed in 33 shoulders of 31 patients who underwent surgery for a massive rotator cuff tear using McLaughlin’s procedure modified by Nobuhara.

Results: The patients with a thicker supraspinatus muscle demonstrated significantly higher JOA scores than those with a thinner muscle (p < 0.01).

Conclusions: The low postoperative JOA score was related with preoperative supraspinatus muscle atrophy but not with preoperative osteoarthritides of the shoulder.

THE RESULTS OF TRAPEZIUS TRANSFER AND PATTE’S PROCEDURE FOR MASSIVE ROTATOR CUFF TEARS
S. Kuroda, MD, J. Maruishi, MD, K. Maruta, MD, N. Ishige, MD, K. Sakai, MD, Matsudo Orthopaedic Hospital, Toyama Red Cross Hospital, Chiba, Japan

Purpose: To make the results of trapezius transfer and Patte’s procedure clear, we evaluated the cases using JOA score, acromio-humeral interval, and angle of active elevation before and 1 year after the surgery.

Patients and Results:
Results and Conclusion: Recurrent rate was 8.3%.

Results and Conclusion: Recurrent rate was 8.3%. The Rowe score at the final follow-up showed excellent in 72 (75%), good in fourteen (15%), fair in three (3%), and poor in seven (7%) patients. The risk factors in recurrent dislocation were subluxation, positive GHL, contact sports athletes, competitive sports level and/or arm- position at capsulorrhaphy (20° < ER). It was recommended that patients having preoperative risk factors should be operated with 10° ER capsulorrhaphy.

Conclusion: In cases of trapezius transfer, only pain improved after the surgery. In cases of Patte’s procedure, all of pain, function, muscle power, and acromio-humeral interval improved significantly after the surgery.

23 CLINICAL RESULTS OF MCLAUGHLIN PROCEDURE AND PATCH METHOD FOR MASSIVE ROTATOR CUFF TEARS
Kato Nobutake, MD, Oimbushi Nobumasa, MD, Ishii Jun, MD, Kaneko Hidetoshi, MD, Sakurai Shinichi, MD, Morioka Takeshi, MD, Department of Orthopaedic Surgery, Yokohama Municipal Citizens Hospital, Yokohama, Japan

Fifteen shoulders of fourteen patients with massive rotator cuff tears were examined. The average age at surgery was 60.1 years. The McLaughlin procedure was performed for 3 shoulders and the patching method was performed for 10 shoulders. Tensor fascia lata was used in 5 shoulders and Marlex mesh was used in 5 shoulders for patching rotator cuff tears. The functional outcome was assessed with the JOA score and muscle strength was measured. The average JOA score improved from 51.6 pts to 88.6 pts in McLaughlin group, and 50.3 pts to 87.0 pts in Patch group. Muscle strength of McLaughlin group was higher than that of Patch group.

24 THE CLINICAL RESULTS OF MODIFIED BANKART AND BRISTOW PROCEDURE OF THE RECURREN TANTERIOR DISLOCATION OF THE SHOULDER
N. Yamamoto, MD, K. Okamura, MD, T. Takuchi, MD, K. Kagaya, MD, T. Hirose, MD, Dept of Orthopaedic Surgery, Sapporo Medical University, Sapporo, Japan

43 shoulders with recurrent anterior dislocation of the shoulder who had received the Bankart procedure augmented by coracoid transfer (modified Bristow technique) were investigated. The mean age at operation was 22.1 years, and the mean follow-up period was 71.3 months. According to the Rowe scoring system, the success rate was 93%. There was no redislocation postoperatively. The average loss of range of motion compared with the opposite side was 12° for external rotation. 96% of the athletes could return to preinjury level. This procedure can achieve a good clinical outcome for a long term.

25 THE LONG TERM RESULTS OF COMBINED BANKART-BRISTOW PROCEDURE FOR RECURRENT ANTERIOR DISLOCATION OF THE SHOULDER
T. Sato, MD, F. Kato, MD, H. Toga, MD, Department of Orthopedic Surgery, Tokyo Metropolitan Police Hospital, Tokyo, Japan

Since 1984 we have used combined Bankart-Bristow procedure for recurrent anterior dislocation of the shoulder. We investigated the long-term results by direct examination of the patients. We evaluated 75 patients, 78 shoulders, who were followed up for more than five years postoperatively. One shoulder had redislocation and another had subluxation. The recurrent rate was 2.6%. The mean loss of external rotation compared was 16.4 degrees. The return to heavy contact sports was achieved in 28 of 32 patients (87.5%). We conclude that this procedure gave good results with a low recurrent rate and a high rate of returning to the heavy contact sports activities.

26 LONG-TERM RESULTS OF THE MODIFIED INFERIOR CAPSULAR SHIFT PROCEDURE FOR RECURRENT TRAUMATIC ANTERIOR INSTABILITY OF THE SHOULDER

Purpose: To evaluate the long-term results of our Modified Inferior Capsular Shift Procedure (MICS) for recurrent traumatic anterior instability of the shoulder.

Materials and Methods: For 18 patients MICS was performed with capsulorrhaphy in 10 degrees of external rotation. Follow-up periods were from 5 years to 10 years 2 months. 17 patients had difficulties in daily living. 10 patients were athletes at a recreational level.

Results: 9 of 10 patients continued recreational level sports. All patients were satisfied with surgery.

Conclusion: They, either those with difficulties in daily living or athletes at a recreational level, all had satisfactory results.

27 A LONG-TERM STUDY ON THE RECURREN TANTERIOR SHOULDER INSTABILITY FOLLOWING MODIFIED INFERIOR CAPSULAR SHIFT PROCEDURE OPERATION

Purpose: To estimate postoperative long-term results following Neer’s MICS procedure.

Materials and Methods: 95 patients (96 shoulders, 79 males and 16 females) were observed for more than 5 yrs postoperatively (Ave 82 mos; 5–12 yrs).

Results and Conclusion: Recurrent rate was 8.3%. The Rowe score at the final follow-up showed excellent in 72 (75%), good in fourteen (15%), fair in three (3%), and poor in seven (7%) patients. The risk factors in recurrent dislocation were subluxation, positive GHL, contact sports athletes, competitive sports level and/or arm- position at capsulorrhaphy (20° < ER). It was recommended that patients having preoperative risk factors should be operated with 10° ER capsulorrhaphy.

28 MIDDLE TERM RESULTS OF INTRAMEDULLARY BONE-CEMENT FIXATION FOR PROXIMAL HUMERAL FRACTURES IN ELDERLY PATIENTS
M. Matsuda, Dept of Orthop, Surg, Yamagata Saisei Hospital, Yamagata, Japan

The purpose is to clarify middle term results of intramedullary bone-cement fixation. Six elders (5 females and one male) were evaluated at two years postoperatively. JOA score, range of motions, VAS of satisfaction, radiographic findings. The avg JOA score was 80.2 points. The ROM comparing with healthy side, 79.6% in elevation, 43.8% in external rotation. The satisfaction was 7.6 points. Cortical bone healings have been obtained in all. Bone resorption were found in 3 cases. These clinical outcomes were similar to those without bone resorption. We conclude middle term results are good.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Cases</th>
<th>Mean age</th>
<th>Mean size of tear</th>
<th>Significant differences</th>
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<tr>
<td>Trapezius transfer</td>
<td>11</td>
<td>59</td>
<td>16.2 cm²</td>
<td>Pain</td>
</tr>
<tr>
<td>Patte’s procedure</td>
<td>8</td>
<td>62</td>
<td>17.3 cm²</td>
<td>All items</td>
</tr>
</tbody>
</table>
29 TREATMENT OF NONUNION OF THE SURGICAL NECK OF THE HUMERUS COMPLICATED BY CAVITATION OF THE HEAD OF THE HUMERUS
T. Naniiwa, K. Ogawa, H. Ikegami, W. Inokuchi, N. Nakamichi, Saseikai Mukojima Hosp, Keio Univ, Tokyo, Japan

When nonunion of the surgical neck of the humerus develops in osteoporosis patients, it tends to cause cavitation to occur in the head of the humerus. The subjects were 5 patients, age range 62–76 years. The procedure consisted of bone grafting followed by insertion of K-wire at the sites of tendon insertion in the tubercles and two tension band wirings were performed. Bone fusion has been observed in every case. Shortening of the length of the humerus, but they all recovered to the point where they could return to their occupation or level of living before the injury.

30 NO TITLE PROVIDED
Yasumoto Matsui, MD, Dept of Orthop Surg, Chuba National Hosp, Aichi, Japan

Surgical results of 8 hemiarthroplasty (average age 70.8 y.o.) for the proximal humeral fracture (dislocation) were reviewed. Three were 3 part fracture, one, 3 part fracture dislocation and four, 4 part fracture dislocation. Stems were all fixed with cement. Tenodesis of UHB were performed in 4 cases and intra-articular ligaments were repaired in 5. At follow up, mean 3 years 8 months (2 y to 5 y 9 m), average JOA score was 83 (71 to 94). Mean active flexion was 114°. Proper prostheses positioning and anatomical repairment for rotator cuffs and intra-articular ligaments was important to gain good post-operative ROM.

31 HEMIARTHROPLASTY FOR GLENOHUMERAL OSTEOARTHROSIS
Y. Tomita, MD, G. Sakurai, MD, K. Nakagaki, J. Ozaki, MD, Dept of Orthopedic Surgery, Nara Medical University, Kashihara City, Japan

Six shoulder hemiarthroplasties were studied in patients with shoulder pain due to osteoarthritis unresponsive to conservative means. The follow-up periods were ranged one to 7 years and the average patient age was 59 years. The mean Constant score improved on 20 points. The improvement was especially marked on the pain. Four of the six examined shoulders were painfree. At followup, 5 patients were satisfied with the surgery, despite poor shoulder function. Major complication could not be observed. Early results with shoulder hemiarthroplasty are encouraging. The prosthesis is inexpensive and easy to use, requires minimal bone resection.

32 THE SHOULDER ARTHROPLASTY WITH THE AEAQUASIS SHOULDER SYSTEM: THE VALIDITY OF IMPLANTATION

We investigated the validity of implantation of the Aequalis Shoulder System (humeral head replacement). Nine shoulders (RA: 6, OA: 1, osteonecrosis: 2) were evaluated radiographically: the alignment of the stem, and inclination of the proximal humerus (XP). Retrotorsion of the humeral head, and adaptability of the head (CT). No case of varus tilt of the stem. The difference of mean inclination angle between pre and postoperation was 5 degrees, while the difference of mean retrotorsion angle was 4. There were no but one cases with protruded outerhead from the osteotomied surface. The alignment of the prosthesis was acquired almost precisely.

33 MECHANICAL PROPERTIES OF REPAIRED INFRASPINATUS TENDONS: COMPARISON OF IMMEDIATE AND DELAYED REPAIR (SECOND REPORT)
K. Kagaya, MD, Asahikawa Kosei Hospital, Asahikawa City, Japan

The initial mechanical properties of repaired infraspinatus tendons of dogs were assessed after immediate and delayed repair using #2 sutures. Group I (n = 8): The tendon was detached from its insertion and sutured to the bone trough. Group D (n = 7): The tendons were detached and repaired 5 weeks later. The average ultimate strength was 155.7 ± 35.7N, 170 ± 7.7N, 53.6N respectively. The average stiffness was 18.5 ± 12.8 KN/m and 13.8 ± 5.6 KN/m, respectively. There was no difference between the two groups.

34 TENDINOPATHY OF THE ROTATOR CUFF: A HISTOPATHOLOGICAL STUDY
R. L. Pradhan, E. Ito, H. Minagawa, T. Shimizu, I. Wakabayashi, Department of Orthopedic Surgery, Akita University School of Medicine, Akita, Japan

This study was designed to outline the histological changes of the supraspinatus tendon prior to demonstrable tear. Five supraspinatus tendon biopsied from patients (avg age 40 years) during open acromioplasty for “impingement syndrome” were examined with light and transmission electron microscopy. Histologically, edema and synovial pro-liferation were visible in the bursa, and granulation and hyalinization were observed in the tendon proper. Ultra-structural findings included tenocytes with vacuoles, splitting and disintegration of the collagen fibers, and whorl like structures, suggesting hypoxic degeneration, microdamage, and repair. These ultrastructural changes were compatible with a degenerative process that leads to weakness of the tendon.

35 THE EXPERIMENTAL STUDY FOR REPAIR OF ROTATOR CUFF: THE EFFECT OF SYNOVIAL TISSUE
K. Kikugawa, Y. Mochizuki, K. Kashiwagi, T. Imaida, N. Okuhira, N. Adachi, Dept. of Orthop Surgery, Hiroshima University, Dept. of Orthop Surgery, Kake Choritu Hospital, Dept. of Orthop Surg., Mazda Hospital, Dept. of Orthop Surgery, Chugoku Rosai Hospital, Hiroshima, Japan

To clarify the effect of synovium on healing process of rotator cuff, following rat model (group-F: only defect, group-S: hole filled with synovium) were investigated using immunostaining with PCNA, TGF β-1, bFGF and in situ hybridization for procollagen type I, III. Histologic mature grading and number of cells positive for PCNA were higher in group-S. Expressions of procollagen I, III and TGF β-1 for group-S were detected whole around the defect, whereas those for group-F were localized adjust to bursal and articular tissue. Thus, synovium enhances tendon healing capacity and TGF β-1 may affect the synovial effect.

36 CLINICAL OUTCOME OF HEMIARTHROPLASTY FOR DISPLACED FRACTURE OF THE PROXIMAL HUMERUS
H. Hashiguchi, MD, H. Ito, MD, A. Takayama, MD, Y. Banzi, MD, Dept of Orthop Surg, Nippon Medical School, Tokyo, Japan

In this study, we analyzed clinical outcomes in cases with proximal humeral fracture treated by hemiarthroplasty. The subjects were 23 cases with proximal humeral fracture, whose average age was 75.4 years. The average follow-up period was 64.0 months. The average postoperative JOA score was 83.7 points. There was a significant correlation between postoperative JOA score and values of AHI and humeral offset. The average JOA score with a spur beneath the acromion was markedly lower than that without it. We conclude that outcomes of hemiarthroplasty are
influenced by factors reflecting functions and conditions of the rotator cuff.

37 CLINICAL RESULTS OF HEMIARTHROPLASTY FOR CHRONIC 2- AND 3-PART FRACTURES OF PROXIMAL HUMERUS: A COMPARATIVE STUDY WITH ACUTE FRACTURES
Purpose: To evaluate the results of hemiarthroplasty for chronic 2- and 3-part fractures of proximal humerus.
Materials and Methods: Twenty-one cases (chronic-group: 7, acute-group: 14) were evaluated by Neer scoring system. The average time elapsed from injury to surgery was 10.4 months in C-group, and 13.7 days in A-group.
Results: All patients in C-group had a failure result. However, in A-group, pain and external rotation were improved, compared to results of A-group.
Conclusions: Results of hemiarthroplasty for chronic fractures showed significant improvement of pain, external rotation and ADL, however, these were inferior to those for acute fractures.

38 Factors Related and Prevention to Shoulder Pain in Elite Swimmers
Taiki Komatsu, Tomoji Ishikawa, Naoki Katayama, Yoshiteru Muto, Dept of Rehabilitation, Tokyo Kosei-Nenkin Hospital, Dept of Orthopaedic, Tokyo Kosei-Nenkin Hospital, Dept of Physical, and Health Education, The University of Tokyo, Tokyo, Japan
Purpose: To investigate the factors related to shoulder pain in a cohort of elite swimmers in an attempt to isolate causes of this disorder. The subjects include 123 swimmers selected to participate in the Japan swimming championships between 1996 and 2000. The incidence of shoulder pain was higher in swimmers who used paddles and flippers and pain occurred more frequently during the weight training.
Swimmers that practiced stretching experienced a lower incidence of shoulder pain (p < 0.01). The practice of performing stretching exercises appears to prevent shoulder pain in this population and should be included as part of the warm-up routine.

39 MUSCLE STRENGTH AROUND THE SHOULDERS IN STUDENT SUMO WRESTLERS
Y. Nakagawa, MD, T. Kotake, MD, T. Nakamura, MD, Dept of Orthop Surgery, Faculty of Medicine, Kyoto University, Kyoto, Japan
Purpose: To study the relationship between sports performance and the muscle strength around shoulders.
Materials and Methods: Twenty-three wrestlers were examined. The isokinetic strength of their internal (IR) and external (ER) rotators and flexor (FX) and extensor (EX) were measured using Cybex. We also divided them into two groups: strong group (S) and weak group (W).
Results: Their IR, ER, EX and FX of S was significantly larger than one of W.
Conclusion: To improve their sports performance in student sumo wrestlers, it was significant to increase their IR, ER, FX and EX, especially.

40 RETURN TO SPORTING ACTIVITY AFTER ROTATOR CUFF REPAIR
M. Hirao, MD, M. Yoneda, MD, S. Fukushima, MD, M. Obata, MD, S. Nakagawa, MD, Otsuka City, Japan
Purpose: To investigate the sporting activity after rotator cuff repairs.
Materials and Methods: We retrospectively studied 19 patients who participated in recreational sports. Sixteen shoulders could be performed primary rotator cuff repair. Latissimus dorsi transfer was chosen in one shoulder, teflon felt patch procedures in two. Sporting activity was classified using Yoneda’s classifications of throwing shoulders.
Results: Sixteen shoulders were classified as complete return. One was as incomplete return and two could not return to sporting activities.
Conclusion: For patients who participate in recreational sports, when rotator cuff tears can be repaired primarily, favorable outcomes can be expected.

41 CLINICAL RESULTS OF DECOMPRESSION FOR IRREVERSIBLE MASSIVE ROTATOR CUFF TEAR
The purpose of this study was to evaluate the clinical results of arthroscopic subacromial decompression (ASD) for irreparable massive rotator cuff tear. We retrospectively studied 10 patients (10 shoulders) who had received this procedure and were followed up for more than 2 years. Our operative indications were 1) irreparable massive rotator cuff tear, 2) sedentary and elderly people, 3) that pain was chief complaint, 4) functional cuff tear. We had good clinical results for pain relief, function, ROM in all patients. But radiographic findings showed the progression of osteoarthritis in 5 patients who were followed-up over 35 months (p = 0.0016).

42 EFFICACY OF MINI-OPEN CUFF REPAIR WITH ARTHROSCOPIC SUBACROMIAL DECOMPRESSION FOR RE-SECTION OF THE POSTOPERATIVE PAIN
K. Sakai, MD, Dept of Orthopedic Surgery, Toyama Red Cross Hospital, Toyama, Japan
We compared the data of mini-open cuff repair with ASD and open cuff repair to evaluate which is painless surgery: the operation time, the amount of bleeding, and time-related changes of sorts of pain markers until 7th day evaluated by nurses. In recent two years, we performed 13 mini-open cuff repair with ASD and 20 open repair. In mini-open cuff repair with ASD, the dose of penta-zocine was significantly lower and diclofenac sodium tended to lower. The operation time was definitely shorter in open surgery. Mini-open cuff repair with ASD is time consuming but less painful than open surgery.

43 MRI NEGATIVE ROTATOR CUFF TEAR
T. Nakatani, K. Fujita, H. Sakai, Y. Iwasaki, M. Kurosaka Dept of Orthop Surg, Shinshu Hospital, Dept of Orthop Surg, Kobe University School of Medicine, Kobe, Japan
There have been no reports concerning whether false negative would turn to be positive or stay in negative. We report two cases of which the MRI signal of rotator cuff was changed within a few months without any new traumatic episodes and each case had an intratendinous tear. These cases indicate that intratendinous tear occurs first, develops to bursal side or articular side tear and advances to full thickness tear. These findings suggest that MRI should be taken for several times for patients with continuous clinical symptoms and signs of rotator cuff tear.
44 EVALUATION OF THE SHOULDER IN THE APPREHENSION TEST POSITION WITH OPEN MAGNETIC RESONANCE IMAGING
Tamohisa Hashiuchi, Goro Sakurai, Jiro Ozaki, Koichi Imada, Dept of Orthop Surg, Nara Rehabilitation Center, Nara, Dept of Orthop Surg, Kurobe City Hospital, Toyama, Japan
Purpose: The purpose of this study is to evaluate the shoulder in apprehension test position with open MRI.
Materials and Methods: Ten stable shoulders in eight patients were examined. MRI was performed with an open MRI system in the apprehension test position.
Results: The conjoined tendon and the area where the biceps muscle long head adhere to the scapula were described clearly. The conjoined tendon was in front of the humeral head.
Conclusion: Open MRI in apprehension test position is useful tool for evaluation conjoined tendon and biceps long head tendon.

45 APPREHENSION TEST AND OPEN MRI: “IMAGE FOR STARTING DISLOCATION OF THE SHOULDER”
Tamohisa Hashiuchi, Goro Sakurai, Jiro Ozaki, Koichi Imada, Dept of Orthop Surg, Nara Rehabilitation Center, Nara, Dept of Orthop Surg, Kurobe City Hospital, Toyama, Japan
Purpose: The purpose of this study is to investigate the instability shoulder in apprehension test position with open MRI.
Materials and Methods: Five patients with recurrent anterior dislocations were examined and scanning was performed with open MRI in the apprehension test position.
Results: The Bankart lesion and Hill-Sachs lesion were imaged at the same image. The course of the subscapularis muscle and conjoined tendon was arc.
Conclusion: The important muscle role of anterior safe guard in the shoulder joint is not only the subscapularis muscle but also the conjoined tendon.

46 THE POSTOPERATIVE EVALUATION OF ARTHROSCOPIC SURGERY USING MR IMAGING OF SHOULDER IN ABDUCTION AND EXTERNAL ROTATION POSITION (ABER METHOD)
Yoshinori Takubo, Motoyuki Ho, data not clear; Masao Kurokawa, Department of Orthopaedic Surgery, Otsu Municipal Hospital Department of Orthopaedic Surgery, Kyoto Prefectural University of Medicine Department of Orthopaedic Surgery, Saikei Suta Hospital, Shiga, Japan
Eight shoulders of 8 patients (age ranged from 21 to 49 years old, average 31 years old) who passed more than three months after arthroscopic Bankart repair and underwent ABER method were examined. The accuracy could induce pain in abduction and in throwing motion.

47 PATHOGENESIS OF OSTEOARTHRITIS OF THE SHOULDER
Y. Nakagawa, MD, T. Mondori, MD, M. Ogawa, MD, Dept of Orthop Surg, Hibaara General Hospital, Nara, Japan
Purpose: The purpose is to clarify the pathogenesis of the primary osteoarthritis (OA) of the shoulder.
Materials and Methods: For research of the polyarticular OA, elbows, wrists, fingers and knees were examined radiologically.
Results: Patients were composed of 30 cases 46 shoulders (One male, 29 females). Most of cases had polyarticular OA. Some cases had OA only in the shoulder joint.
Conclusion: Most of OA is caused by constitutional disease. A minority group may have the different pathogenesis.

48 CLINICAL RELEVANCE OF SCAPULAR ABDUCTION IN PAINFUL THROWING SHOULDERS
The purpose of this study was to analyze the relationship between the scapular motion in the patients with throwing pain and the clinical findings. Twenty-six patients underwent bilateral shoulder A-P X-rays at every 30 degree abducted position. The Δscapular abduction ratio was statistically smaller in the throwing side at 60–90 degree abduction. Painful sign was related to small Δscapular abduction ratio. The result that small Δ SAR in throwing side related to painful sign means a loss of scapular abduction could induce pain in abduction and in throwing motion.

49 DIAGNOSTIC VALUES OF PHYSICAL TESTS FOR LABRAL INJURIES IN THROWING ATHLETES
E. Ito, T. Shimizu, I. Wakabayashi, M. Kobayashi, H. Minagawa, R.L. Pradhan, S. Yamada, W. Watanabe, Department of Orthopedic Surgery, Akita University School of Medicine, Akita, Japan
This study was designed to determine diagnostic values of physical tests for labral injuries. Among 135 overhead athletes, arthroscopic diagnosis was established in 42 shoulders. There were 32 labral injuries including 19 frayings, 7 detachments, etc. Crank test, anterior slide test, active compression test, biceps tension test, SLAP provocation test, and pain provocation test were performed by a single examiner, and the accuracy was calculated. The accuracy of the tests for the superior labral detachment was the highest (90%), followed by that of the pain provocation test (78%). These tests are useful in making diagnosis of superior labral detachment.

50 SURGICAL OUTCOME OF THE ARTHROSCOPIC TREATMENT FOR THE THROWING INJURY OF THE SHOULDER
T. Kotake, MD, Dept of Orthop Surg, Mitsubishi Kyoto Hospital, Kyoto, Japan
The study subjects consisted of patients with painful throwing shoulder and followed up for more than one year after surgery. There were 12 males. The age of the patients at operation range from 18 to 35. Treatment consisted of repair of the rotator cuff, labral tears and subacromial space. JOA score has improved from 18 to 35. Treatment consisted of repair of the rotator cuff, labral tears and subacromial space. JOA score has improved from 18 to 35. Treatment consisted of repair of the rotator cuff, labral tears and subacromial space. JOA score has improved from 18 to 35.

51 ARTHROSCOPIC FINDINGS AND SURGICAL TREATMENTS OF PAINFUL THROWING SHOULDERS
T. Yamazaki, MD, M. Hachiya, MD, K. Onari, MD, H. Mihara, MD, K. Yamada, MD, Dept of Orthopaedic Surg, Yokohama Minami Kyosai Hosp, Yokohama, Japan
The purpose of this study was to report arthroscopic findings and outcomes following arthroscopic surgery on painful throwing shoulders. Forty-three painful throwing shoulders of baseball players underwent arthroscopic surgery. Clinical results of arthroscopic debridement were evaluated using the JSS Shoulder Sports score. As the characteristic findings in painful throwing shoulder, articular side partial tear of the rotator cuff and also detached or fraying lesion between the superior and postero-superior portion of the labrum were revealed by arthroscopic observation. Arthroscopic debridement was considered as an effective treatment for pain reduction, though insufficient for recovery of performance level.
EFFECTIVENESS OF PREOPERATIVE IMAGING OF GREATER TUBerosITY NOTCHES IN SHOULDERS OF BASEBALL PLAYERS


Purpose: To investigate whether greater tuberosity notches in shoulders of baseball players could be detected by preoperative imaging.

Methods: The presence of greater tuberosity notches on plain X-ray (45-degrees cranio-caudal view), CT, and MRI was investigated regarding the relationship with the presence and the size of notches on shoulder arthroscopy in 45 baseball players.

Results: Sensitivity, specificity, and accuracy of each imaging data was 82%, 68%, and 75% on plain X-ray, 80%, 83%, and 82% on CT, 96%, 70%, and 82% on MRI, respectively.

Conclusions: It was possible to detect the presence of greater tuberosity notches on preoperative imaging.