

patients rated their final overall results as good or excellent. Improvement of active forward flexion (127° to 139°), abduction (115° to 135°) and internal rotation did not reach statistical significance ( $P > .05$ ). Although statistically significant, compared active internal and external rotation did not deteriorate substantially (from 8 to 6 Constant score points;  $P = .015$  and from 50° to 37°;  $P = .004$ ) from the thirty-two months to the final follow-up. At final follow-up, a rupture of the PMT was sonographically identified in 2 patients (12%). One patient (5%) underwent reverse total shoulder arthroplasty and two patients (12%) showed radiographic evidence of cuff tear arthropathy (Hamada stages 4 or 5), both with the sonographically identified rupture of the PMT.

**Conclusion:** Pectoralis major transfer for an irreparable subscapularis tear leads to significant subjective and objective improvement over 20 years of follow-up. It is associated with a low rate of salvage reverse total shoulder arthroplasty. If the transfer fails, cuff tear arthropathy may develop.

**Paper #26 MID-TERM CLINICAL AND STRUCTURAL EVALUATION OF PLATELET-RICH PLASMA IN ROTATOR CUFF REPAIR—A PROSPECTIVE RANDOMIZED STUDY**

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**Background:** Platelet-rich plasma (PRP) has been studied with the objective of reducing retear rate and improving functional outcome after rotator cuff repair. Only one study to date reported its mid-term effect.

**Hypothesis:** PRP promotes better functional and structural results in arthroscopic rotator cuff repair.

**Study Design:** Randomized controlled trial; Level of evidence, 1.

**Methods:** All patients underwent arthroscopic single-row repair of small to medium supraspinatus tear. At the end of the surgical procedure, liquid PRP prepared by apheresis with autologous thrombin was applied in the tendon-to-bone interface in the PRP group. The outcomes were assessed by the University of California at Los Angeles (UCLA) and Constant scores and visual analog scale (VAS) for pain at 6, 12, 24 and 60 months after surgery, and Magnetic resonance imaging (MRI) at 12 and 60 months. The significance level was 5%.

**Results:** Of 54 patients initially randomized, we analyzed the clinical outcomes in 51 (25 control, 26 PRP) and the structural outcomes in 44 (22 each group). At the 60-month follow-up, the UCLA scores were  $32.5 \pm 3.8$  and  $32.1 \pm 4.6$  in the control and PRP groups, respectively ( $P = .992$ ). The mean Constant scores were  $82.0 \pm 9.5$  in the control group and  $82.1 \pm 11.0$  in the PRP group ( $P = .699$ ). The VAS scores were  $1.4 \pm 1.8$  and  $1.5 \pm 2.1$  in the control and PRP groups, respectively ( $P = .910$ ). None of the clinical assessments at 6, 12 and 24 months in either group produced statistically significant differences, and both groups showed significant improvements throughout the follow-up time in the three evaluations ( $P < .001$ ). The control group exhibited 1 full-thickness retear (Sugaya type IV) and 11 partial retears (Sugaya type III), while the PRP group had 7 partial retears (Sugaya type III). The overall number of retears did not differ between groups ( $P = .203$ ).

**Conclusion:** PRP obtained by apheresis and applied in liquid consistency with the addition of thrombin at the end of single-row repair of supraspinatus tears did not promote better clinical or structural results at 60-month follow-up.

**Paper #27 LOCKING-PLATE FIXATION OF PROXIMAL HUMERUS FRACTURES IN PATIENTS OVER 60 CONTINUES TO BE ASSOCIATED WITH A HIGH COMPLICATION RATE**

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**Background**

Locking plate technology has increased fixation (ORIF) of proximal humerus fractures dramatically. However, reported rates of success and complications have varied widely. A number of technical pearls have been recommended to lower the complication rate of this technique. These include valgus reduction of the fracture, metaphyseal shortening for enhanced fracture stability, augmentation of the fixation with sutures through the rotator cuff and plate, and the selective addition of fibular strut allograft augmentation. In addition, delayed postoperative rehabilitation have been associated with success in some case series. Finally, shorter proximal locking screws, to avoid iatrogenic or delayed screw penetration into the joint, have become more frequent. There have been few large, single center studies on the modern application of this technology.

**Methods**

Between 2005 and 2015, 173 consecutive proximal humerus fractures in patients over the age of 60 were treated at our institution with internal fixation using locked plating. Shoulders with less than 2 years of follow-up were excluded from the study unless they had undergone reoperation or radiographic failure. This left 131 shoulders available for final analysis (76% of eligible). The average age was 73 (60-95) years, and 84% were females. Fractures were classified according to Neer's criteria as 2-part fractures (61-47%), 3-part fractures (59-45%), and 4-part fractures (11-8%). Failure was defined as reoperation or radiographic evidence of hardware failure, severe arthritis, and intraarticular screw penetration. The average follow-up was 6.1 years.

**Results**

Failures, complications and reoperation rate  
There was an overall failure rate of 34%. This correlated with fracture type, with a failure rate of 26% in 2-part fractures (16 failures), 39% in 3-parts (23 failures), and 45% in 4-parts (11 failures) [Table 1]. Failure rate was also correlated with age, with a 26% failure rate for patients in their 60s, 40% failure rate for patients in their 70s, and 48% failure rate for patients in their 80s [Table 2]. None of the six patients in their 90s failed. There was no difference between the failure rate with and without fibular allograft (33% vs 34%).

The main complications that led to failure were AVN with severe head collapse ( $\pm$ screw penetration) in 23 patients (52% of failures), intraarticular screw penetration in 6 patients (14% of failures), hardware failure in 5 patients (11%), severe posttraumatic arthritis in 4 patients (9%), severe cuff failure in 3 patients (7%), nonunion in 2 patients (5%) and severe malunion in 1 patient (2%). When all surgical complications were included, there was an overall complication rate of 44%. The majority of complications that didn't lead to revision or failure were mild, asymptomatic AVN (6 cases), and mild, asymptomatic arthritis (3 cases). There was also one case of tuberosity escape, one asymptomatic loose screw, one case of

**Table 1**

	Failure rate (%)	Reoperation rate (%)
2 part	26%	7%
3 part	39%	14%
4 part	45%	18%