This update reviews material presented at the 2008 annual meetings of the American Society for Surgery of the Hand (ASSH), American Association for Hand Surgery (AAHS), and the American Academy of Orthopaedic Surgeons (AAOS) as well as articles published in the field of hand surgery (other than those published in this journal) between August 2007 and July 2008. Over the years, as with other maturing organizations, the trend at meetings has been for fewer free papers and more symposia and hands-on workshops, including many non-continuing medical education (non-CME)-credit industry-sponsored workshops in facilities adjacent to the accredited scientific meeting. In addition, both hand surgery organizations feature presentations on shoulder and elbow surgery and general microsurgery that are beyond the scope of this review. Meeting abstracts for the annual meetings of the ASSH and the AAOS are maintained online at www.assh.org and www.aaos.org, respectively.

**Trauma**

Although internal fixation is increasingly used to treat distal radial fractures, high-quality data on the relative merits of this modality have been lacking. There is now level-I evidence to consider. In a prospective randomized trial that was presented to the ASSH, fifty patients with complex or unstable fractures of the distal part of the radius were randomized to either external fixation or internal fixation with fragment-specific fixation (Trimed system) (Trimed, Valencia, California). At both seven weeks and one year after surgery, the patients in the internal fixation group had significantly better grip strength, wrist motion, and forearm motion. However, Disabilities of the Arm, Shoulder and Hand (DASH) scores (a measure of upper limb function) and radiographic appearance were not different between the two groups. In a second prospective randomized trial presented to the ASSH, patients were randomized to external fixation or to one of two methods of locked plate fixation (either volar or radial). While the locked volar plating group had significantly better DASH scores at six and twelve weeks, all groups had similar DASH scores and motion at six months. At the time of the latest follow-up, though, the radial plating group had significantly better preservation of radial length and inclination. Taken together, these results suggest a modest benefit to internal fixation over external fixation, at least in the short term.

Unfortunately, the long-term advantages of improved reduction after distal radial fracture remain unclear. In a recent study, Forward et al. followed 106 patients who had sustained a fracture of the distal part of the radius between 1960 and 1968 and had been less than forty years old at the time of the injury1. While 68% of the patients with intra-articular fractures had posttraumatic arthritis at the time of follow-up, thirty-three to forty-two years later, none had had salvage surgery and the mean DASH scores were equal to population norms. Extra-articular malunion was similarly correlated with long-term joint-space narrowing but not with symptoms, grip strength, or function.

Both magnetic resonance imaging and bone scans are used to detect occult scaphoid fractures. Is there any advantage to one modality over the other? The authors of a study that was presented to the ASSH reviewed 100 consecutive patients who were suspected of having a scaphoid fracture on clinical grounds despite having normal findings on initial radiographs. All patients were evaluated with both magnetic resonance imaging and bone scans. True fractures were confirmed when any two modalities (magnetic resonance imaging, bone scans, or subsequent radiographs) subsequently confirmed a fracture. Overall, twenty true fractures were identified. There were four false-negative and no false-positive findings on magnetic resonance images, whereas there were no false-negative but eight false-positive findings on bone scans. Several conclusions can be drawn from this study: (1) many patients suspected of having an occult scaphoid fracture do not have a fracture,
Displaced scaphoid fractures are often treated with screw fixation. Optimal screw placement was the subject of three studies that were presented to the AAOS. In one study, computed tomography images of twenty normal wrists were used to determine guide-pin location for perfectly central screw placement in the scaphoid. The path was noted to require removal of a part of the trapezium. The second study, which also involved computed tomography images of twenty normal wrists, defined optimal placement as the longest screw path that remained within the scaphoid. The distal entry position was roughly 2 mm dorsal to the volar radial corner of the distal part of the scaphoid. The third study evaluated computer-assisted screw placement in ten cadaver wrists and demonstrated that computer assistance was helpful for significantly reducing radiation exposure time and the number of guidewire placement attempts; in only one case was more than one attempt needed to achieve central guidewire placement with the computer-assisted method, whereas an average of 2.4 ± 1.1 attempts were needed with the freehand method.

While internal fixation of scaphoid fractures can improve reduction and avoid a period of cast immobilization and its attendant downtime, few studies have directly compared the outcomes of these two treatments. Dias et al. reported the results of a prospective randomized trial of eighty-eight patients who initially were managed with either Herbert screw fixation or below-the-elbow casting. The casting group was reassessed for union at eight weeks; if union was in question, open reduction and screw fixation was done at that time. Four patients who initially were managed with a cast required conversion to open reduction. The sample size was sufficient to provide a 90% probability of detecting a 10% difference in terms of the symptom score, strength, or motion. After a minimum duration of follow-up of five years (mean, eight years), the updated results also showed no significant difference in terms of symptoms, strength, motion, or radiographic appearance. Interestingly, malunions were more common in the surgical treatment group, whereas the scapholunate angle was more likely to be increased in the casting group. Arthritis associated with long screws was noted in association with four surgically treated fractures. The authors concluded that, even at longer-term follow-up, the outcome of cast treatment of scaphoid fractures is comparable with that of surgery.

Ligament reconstruction is often recommended for the treatment of scapholunate instability, but the long-term results are rarely reported. Good early results have been reported in association with dorsal intercarpal ligament capsulodesis, but unfortunately these results do not hold up in the long term. A study of sixteen such wrists that were evaluated at a minimum of five years (mean, seven years) after surgery showed that posttraumatic arthritis had developed in half of the wrists and that functional limitations were noted in association with 42% of the wrists. The mean DASH score (19 points) suggested mild disability.

Why some patients with carpal instability have progression to arthritis and others do not has been somewhat mysterious, but a recent study suggested that the difference may be related to lunate morphology. That study of forty-five patients with a scaphoid nonunion demonstrated a significant association between the presence of an articulation between the lunate and the hamate (a type-II lunate) and the absence of carpal collapse. Patients with this more stable lunate configuration may be more amenable to joint-sparing treatment.

One of the most common calls for hand surgeons from the emergency room concerns nailbed lacerations. A recent prospective randomized trial suggested that such injuries can be treated without sutures. Forty patients with nailbed lacerations were randomized to repair with either cyanoacrylate (DERMABOND; Ethicon, Somerville, New Jersey) or sutures. The time of repair (nine compared with twenty-eight minutes) significantly favored the use of cyanoacrylate, with no difference between the groups at one, three, or six months in terms of pain, function, or either physician or patient-perceived fingernail appearance. With similar quality in less than half the time, hand surgeons may appreciate the value of this innovation.

**Arthritis and Other Degenerative Disorders**

Modern disease-modifying anti-rheumatic drugs have dramatically improved the prospects for patients with rheumatoid arthritis. Given these advances, what advantages does surgery offer for the treatment of rheumatoid arthritis? A prospective study that was presented to the ASSH addressed this issue. A total of 158 patients with rheumatoid arthritis were recruited from three centers. Patients with less severe disease were managed medicably, whereas the more severely involved hands were treated with silicone implant arthroplasty. Initially, hand function (as measured with the Jebsen-Taylor test and Michigan Hand Questionnaire) was significantly better in the patients who were entered into the medical treatment arm. At one year of follow-up, hand function was significantly improved in the surgical treatment group but not in the medical treatment group, and the two groups had similar function. Improvement following surgery was not affected by preoperative extensor tendon deficit or subluxation.
What’s New in Hand Surgery

While flexible silicone implants remain the most commonly used prosthesis for the treatment of finger arthritis, the question remains as to whether there are differences between silicone implant types. A prospective randomized trial that was presented to the ASSH attempted to answer this question. Forty patients with rheumatoid arthritis who were scheduled for metacarpophalangeal arthroplasty of all four fingers of one hand were randomly assigned to receive either Swanson implants (Wright Medical, Arlington, Tennessee) or NeuFlex implants (Johnson and Johnson, New Brunswick, New Jersey). At one year, the average motion of the NeuFlex implants was 10° greater than that of the Swanson implants (50° compared with 40°), with a significant difference only for the little finger. The overall score and cosmesis subset score on the Michigan Hand Questionnaire, however, were better for the Swanson devices.

With any reconstructive procedure, patient expectations are a critical factor. A study that was presented to the AAOS evaluated patient expectations and satisfaction with regard to pain, function, and appearance for forty patients undergoing silicone implant arthroplasty for the treatment of rheumatoid arthritis. Preoperatively, the patients rated function as their most important concern, followed by pain and then appearance. After surgery, satisfaction was most strongly correlated with changes in appearance. The authors concluded that cosmesis may be underrated both as a motivator for finger arthroplasty in patients with rheumatoid arthritis and as a determinant of satisfaction postoperatively.

Two papers that were presented to the ASSH discussed the long-term results of proximal row carpectomy. A series of eighty-one patients who had been operatively managed for a variety of indications between 1967 and 1992 was reviewed at a minimum of fifteen years of follow-up. The average age of the patients at the time of surgery was forty-one years. Sixty-one patients responded to a questionnaire. At the time of the latest follow-up, fifteen to forty years after surgery, 44% of the respondents were dissatisfied because of pain, weakness, or loss of function, and 26% had had additional surgery with conversion to arthrodesis. The other series included twenty-four affected fingers were managed with resection of one slip of the flexor digitorum superficialis, with or without pulley release. The patients were followed for an average of four years after surgery. Only one patient had mild residual triggering. Thus, when the surgeon is faced with a difficult problem of recurrent triggering or triggering associated with diffuse tendon enlargement, flexor digitorum superficialis slip excision seems to be a useful surgical “trick” to keep in mind.

Tendon

The treatment of trigger finger in patients with diabetes mellitus is often complicated by the recurrence or incomplete relief of symptoms. Both of these problems are related to the diffuse tendon enlargement seen in these patients, which is different from the nodular enlargement usually seen in patients without diabetes. A recent study suggested an innovative method to address this problem and to reduce triggering while allowing an option to preserve the A1 pulley6. Fourteen diabetic patients with twenty-four affected fingers were managed with resection of one slip of the flexor digitorum superficialis, with or without pulley release. The patients were followed for an average of four years after surgery. Only one patient had mild residual triggering. Thus, when the surgeon is faced with a difficult problem of recurrent triggering or triggering associated with diffuse tendon enlargement, flexor digitorum superficialis slip excision seems to be a useful surgical “trick” to keep in mind.

Nerve

Is keyboard use associated with higher rates of carpal tunnel syndrome? Recent studies have questioned what has certainly been the conventional wisdom among those who use keyboards often. Now perhaps we have the definitive survey addressing this issue8. A survey was mailed to 2500 households in southern Sweden. Remarkably, >80% of the individuals who received a questionnaire responded, and 80% of those who reported any symptoms presented for a medical evaluation to assess the presence of carpal tunnel syndrome. Keyboard ex-
Tension was graded from heavy (more than four hours per day) to light (less than one hour per day). There was no difference among the various groups with regard to the prevalence of carpal tunnel syndrome. Indeed, the group with the highest exposure had a slightly lower prevalence of carpal tunnel syndrome than did the groups with lower exposure. However, a cross-sectional study such as that one is poorly suited to evaluate causative factors; it is possible that the prevalence of carpal tunnel syndrome in the higher-use group was influenced by a “survivor effect,” with symptomatic individuals dropping out as exposure increased, leaving only a more hardy subset with fewer symptoms in the highest-exposure groups. The only way to test for such an effect is to follow a population over time and to compare dropout rates across the various exposure groups. Hopefully, the investigators will continue to follow that population and will report on the outcome over time.

It is well known that the pressure in the carpal tunnel is elevated in patients with carpal tunnel syndrome, but there are few data on how high the pressure goes with activities of daily living. A fascinating study that was presented to the ASSH demonstrated that the pressure goes very high, indeed. Twenty patients undergoing endoscopic carpal tunnel release agreed to the insertion of a catheter pressure transducer intraoperatively, with pressure being measured at the proximal, middle, and distal parts of the carpal tunnel before and after release during pinch and grip activity. Baseline pressures were 30 to 50 mm Hg before release and roughly 10 mm Hg after release. With maximum grip before release, however, pressure at the level of the hook of the hamate increased to levels of 1000 mm Hg (the limit of measurement of the device), and maximum pinch resulted in pressures of 600 mm Hg. That study demonstrated for the first time that pressures far above mean arterial pressure can be generated within the carpal tunnel, at least in patients with carpal tunnel syndrome. A better understanding of the effects of this pressure elevation on the biology of the carpal tunnel contents may improve our understanding of carpal tunnel syndrome.

Postoperative therapy is commonly prescribed after carpal tunnel surgery, but does it help? A recent prospective randomized trial suggests that it does not. A study of 150 patients who were managed with or without two weeks of postoperative therapy showed no difference in terms of the return-to-work date, strength, or function. The therapy sessions cost between $600 and $900. The authors concluded that such costs seemed unjustified.

One of the more severe problems faced by the hand surgeon is the treatment of chronic regional pain syndrome, formerly known as reflex sympathetic dystrophy. A recent study evaluated the risk of recurrent chronic regional pain syndrome after revision carpal tunnel release. In that study, thirty-four patients with a history of chronic regional pain syndrome were evaluated preoperatively with testing of reflex-evoked vasoconstrictor responses. Eight of eleven patients with abnormal preoperative studies had recurrent chronic regional pain syndrome after surgery, compared with only three of twenty-three patients with normal preoperative studies. These data suggest that preoperative autonomic testing of patients with a history of chronic regional pain syndrome is helpful for predicting postoperative chronic regional pain syndrome; patients so identified might benefit from perioperative anti-chronic regional pain syndrome therapy, such as long-acting autonomic blockade.

Hand Tumors
The new field of individualized medicine in which a person’s genetic and epigenetic makeup (i.e., how the genes are expressed) is used to predict the response to different treatments is beginning to impact hand surgery. A recent report described an analysis of tissue from Dupuytren cords, Dupuytren nodules, and normal palmar fascia. A specific genetic pattern was noted in the Dupuytren tissue, with dysregulation of cytoskeleton development and lipid and collagen metabolism all being noted. Eventually, such data may identify the molecular mechanisms involved in the pathogenesis of Dupuytren disease. Such data also can be useful prognostically.

In another study, presented to the AAHS, recurrence after fasciectomy for the treatment of Dupuytren disease was significantly correlated with the expression of type-III collagenase and procollagen peptidase in the excised specimen. In the future, such information may be used to devise different treatment strategies for such patients. It is not hard to imagine that in the years to come even more hand conditions will be treated on the basis of each patient’s unique biology.

One of the major challenges in the surgical treatment of Dupuytren disease is the prevention of recurrence after release of the contracted proximal interphalangeal joints. While surgical release is often successful for achieving full extension in the operating room, recurrence is common. It may not be possible to splint a corrected digit in extension because of the loss of circulation resulting from stretching of the contracted neurovascular bundle. A report that was presented to the AAHS discussed an alternative, preoperative extension of the joint with a dynamic external fixator, the Digit Widget (Hand Biomechanics Lab, Sacramento, California). Twenty digits were treated with surgery alone, which often required the use of skin grafts as well. Nine digits were treated preoperatively with the fixator; two of these digits had full correction and did not require surgery to excise the tissue affected by Dupuytren disease or to release the joint. At the time of the latest follow-up, the results were similar between the two treatments for patients with contractures of <60°. However, for patients with contractures of >60°, the average improvement was 30° in the surgery-alone group as compared with 55° in the fixator group. No skin grafts were required when preoperative distraction was used. Preoperative distraction with a dynamic external fixator seems to be a useful adjunct for the treatment of proximal interphalangeal joint contracts.
What’s New in Hand Surgery

Microvascular
Hand transplantation is still performed infrequently, but interest in the topic of reconstructive transplantation continues to grow, with the possibility of face, arm, and other functional units also being transplanted. Consistent with this interest, the American Society for Reconstructive Transplantation was organized at a meeting in Philadelphia in July 2008. Also, an update on the three American hand transplantation patients, one of whom had been followed for eight years after surgery, was reported to the AAOS. All three patients were doing well clinically, and one was taking no steroid medication at all. All patients were back at work.

Upcoming Events
The Sixty-fourth Annual Meeting of the American Society for Surgery of the Hand will be held in San Francisco, California, on September 3 through 5, 2009. It will be a combined meeting with the American Society of Hand Therapists (ASHT). The American Society for Surgery of the Hand also will cosponsor a course on Advances in Hand Therapy with ASHT, to be held in Nashville, Tennessee, on May 15 and 16, 2009. In addition, the American Society for Surgery of the Hand will offer a course on Advanced Techniques in Elbow Reconstructive Surgery, to be held in Rosemont, Illinois, on June 26 and 27, 2009, and a Comprehensive Review Course in Hand Surgery, to be held in Chicago, Illinois, on July 10 through 12, 2009. Finally, the American Society for Surgery of the Hand will hold a combined meeting with the British Society for Surgery of the Hand in London, United Kingdom, from April 30 through May 2, 2009.

The Fortieth Annual Meeting of the American Association for Hand Surgery will be held on January 6 through 9, 2010. This meeting is always held in combination with the annual meetings of the American Society for Reconstructive Microsurgery and the American Society for Peripheral Nerve, which will be held on January 9 through 13, 2010. These three organizations also share certain management functions, permitting closer integration of their meetings, even offering a combined registration option.

The meetings listed above are open to all interested parties. Further details will be forthcoming on the society web sites listed below. The annual meetings of both the American Society for Surgery of the Hand and the American Association for Hand Surgery accept free papers and also feature a wide variety of instructional courses and symposia, many with hands-on sessions.

Membership in the two hand surgery societies is restricted to individuals who have had specific training in hand surgery and, in the case of the American Society for Surgery of the Hand, those who have received the Certificate of Added Qualification in Hand Surgery offered by the American Boards of Orthopaedic Surgery, Plastic Surgery, and Surgery. Additional information on membership as well as on any of the above meetings can be obtained by contacting the organizations directly. Finally, both organizations maintain active web sites, with educational and informational content directed to the public and interested medical professionals as well as members.

Evidence-Based Orthopaedics
The editorial staff of The Journal reviewed a large number of recently published research studies related to the musculoskeletal system that received a Level of Evidence grade of I. Over 100 medical journals were reviewed to identify these articles, all of which have high-quality study design. In addition to articles already cited in this update, ten additional level-I articles were identified that were relevant to hand surgery. A list of those articles is appended to this review following the standard bibliography. We have provided a brief commentary about each of the articles to help to guide your further reading, in an evidence-based fashion, in this subspecialty area.

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References


What’s New in Hand Surgery

Evidence-Based Articles Related to Hand Surgery


In this randomized trial of twenty-one patients with distal radial fractures, the use of cyclic plastic compression during the six-week immobilization period resulted in a significant (p < 0.05) 25% increase in muscle strength and 15% increase in wrist motion at ten weeks after the injury. The authors suggested that a larger trial of this intervention is warranted, which seems to be a reasonable conclusion, especially as the main effect was noted on the day on which the cast was removed, with little additional benefit to compression between six and ten weeks. Some sort of blinding also would be important in any follow-up study, to be sure that the benefit of compression is not simply due to increased attention by the therapist during the six weeks of cast treatment. Finally, it would be interesting to know if intermittent compression had any effect on fracture-healing.


As in other similar studies, this prospective randomized trial of sixty-five patients who were followed at three, six, and twelve months after surgery demonstrated no difference in terms of satisfaction or strength when simple trapeziectomy was compared with trapeziectomy plus flexor carpi radialis suspensionplasty. The group that was managed with trapeziectomy alone had significantly better motion. The evidence continues to suggest that as far as trapeziometacarpal arthritis is concerned, simple trapeziectomy provides outcomes similar to more complicated alternatives.


This meta-analysis of the results of external fixation as compared with closed treatment for displaced or unstable distal radial fractures included the results for 102 patients in fifteen randomized or quasi-randomized trials. The results showed significantly better final reductions in the external fixator group, with no evidence of any difference in terms of the final functional outcome. The fixator group also had a higher rate of complications, mostly pin-related. As usual, significant methodological weaknesses in the included studies limited the conclusions that could be drawn.


This systematic review included 940 mostly older adults from thirteen randomized or quasi-randomized controlled trials that compared percutaneous pinning with either casting or other pinning variations. As with many other systematic reviews, methodological weaknesses in the included studies prevented any definitive conclusions. However, it appeared that biodegradable pins and the Kapandji pinning methods were associated with the highest rates of complications, especially in the context of early mobilization.


This systematic review identified ten randomized or quasi-randomized studies comparing various bone grafts or bone-graft substitutes with no graft for the treatment of distal radial fractures. Studies variously compared casting or pin fixation with or without autologous bone graft, hydroxyapatite bone cement (Norian SRS; Norian, Cupertino, California), or methymethylacrylate. While some studies showed some improvement in terms of anatomic results in association with the use of bone graft or a bone-graft substitute, there was insufficient evidence to draw any conclusions regarding better outcomes or safety of bone grafts or bone-graft substitutes for this indication. Hand surgeons should consider this evidence, or the lack of it, when assessing the costs and benefits associated with the use of bone grafts and bone-graft substitutes for the treatment of osseous defects associated with distal radial fractures.


This systematic review identified only one controlled trial that evaluated the effect of postoperative therapy on the results of metacarpophalangeal arthroplasty. This study compared the results of continuous passive motion with those of conventional therapy in twenty-two patients and demonstrated no difference in outcome. This report underlines that much of what hand surgeons do or prescribe remains without substantial supportive evidence, even for fairly common procedures, such as metacarpophalangeal arthroplasty.


Sixty consecutive patients with Herbert type-B1 and B2 fractures were randomized to either Acutrak screw fixation or cast treatment. Seven fractures (five in the screw fixation group and two in the cast group) were displaced. At one year of follow-up, the fractures in the screw fixation group had healed significantly faster than those in the nonoperative group (mean time to healing, nine compared with fourteen weeks), with one delayed union and no malunions in the screw fixation group as compared with four nonunions and three malunions in the nonoperative group. The patients in the screw fixation group returned to work seven weeks sooner and to sport nine weeks sooner than did the patients in the cast group. The authors concluded that surgical fixation of Herbert type-B1 and B2 fractures has some advantages over cast treatment. The conclusions of this study differ from those of the recent meta-analysis by Yin et al. (described later in this section), but, given the small numbers involved, this difference in conclusions between the two studies could be related to the inclusion of displaced fractures in the cast group.


In this study, eighty patients who were to be managed with a small AO external fixator (Synthes USA, West Chester, Pennsylvania) were randomized to have either stainless steel or titanium-alloy pins. There was no significant difference between the two materials with regard to the rate of pin-related complications, but pain was significantly less in association with the titanium pins.

This study was an update of a previous Cochrane review. On the basis of thirty-three eligible randomized trials, the authors concluded that there is little evidence supporting a change in practice away from open carpal tunnel release. Three studies involving a total of 294 patients demonstrated a weighted mean difference of six days (95% confidence interval, three to nine days) in return to work in favor of endoscopic release as compared with open release. Other outcomes were similar between the two groups. The authors concluded that the decision to perform one procedure as opposed to another appears to be driven by surgeon and patient preference rather than data, although the data do support a small difference in favor of endoscopic surgery as far as return to work is concerned.


When scaphoid fractures are undisplaced, some surgeons (and patients) prefer internal fixation, which can avoid a period of cast immobilization and its attendant downtime. Others have concerns regarding the balance between the risks of surgery and the benefits of earlier activity. This systematic review included 692 patients from seven randomized and quasi-randomized trials in which surgery was compared with cast treatment for undisplaced or minimally displaced acute scaphoid fractures. The nonunion rate, return to work, grip strength, range of wrist motion, complications, patient evaluation, and incidence of osteoarthritis were all assessed. The studies showed that operative treatment did not provide significantly better results in terms of healing, return to work, strength, motion, or satisfaction but that it did increase the risk of complications and, possibly, of late scaphotrapezial arthritis. The results of this meta-analysis call into question an aggressive approach toward surgery for undisplaced and minimally displaced scaphoid fractures and remind us that the vast majority of such injuries heal satisfactorily with cast treatment.