

DISTRACTIONS

The Newsletter of
The Limb Lengthening and Reconstruction Society: ASAMI North America

Volume 10, Number 2 April/May 2004

Fourteenth Annual Scientific Meeting
of
Limb Lengthening and Reconstruction Society

In order to make travel and hotel arrangements for the upcoming annual meeting, please refer to the following meeting program sketch. The program will be finalized within two weeks and will be posted online and forwarded via e-mail.

Friday, July 23, 2004

7:30–8:00 a.m.	Continental Breakfast
8:00–8:10 a.m.	Welcome, Disclosure, Goal Setting
8:10–10:00 a.m.	Abstract Presentations
10:00–10:30 a.m.	Break/Visit Corporate Partners
10:30–11:15 a.m.	Abstract Presentations
11:15 a.m.–12:15 p.m.	Alessandro Codivilla Lecture Presenter – <i>Hiroyuki Tsuchiya, PhD, MD</i>
12:15–1:30 p.m.	Lunch
1:30–3:00 p.m.	Master Demonstrations #1, 2
3:00–3:30 p.m.	Break
3:30–5:00 p.m.	Moderator/Panel Case Presentation #1
5:30–7:00 p.m.	President's Reception

Saturday, July 24, 2004

7:30–8:00 a.m.	Continental Breakfast
8:00–10:00 a.m.	Abstract Presentations
10:00–10:30 a.m.	Break/Visit Corporate Partners
10:30–11:15 a.m.	Abstract Presentations
11:15 a.m.–12:15 p.m.	Presidential Guest Speaker – <i>Captain Norman Baker</i>
12:15–1:30 p.m.	Lunch
1:30–2:45 p.m.	Master Demonstration #3
2:45–3:15 p.m.	Break
3:15–4:45 p.m.	Moderator/Panel Case Presentation #2

Sunday, July 25, 2004

7:30–7:45 a.m.	Continental Breakfast
7:45–8:45 a.m.	Annual Membership Meeting
9:00–10:20 a.m.	Abstract Presentations
10:20 a.m.–10:45 a.m.	Break/Visit Corporate Partners
10:45 a.m.–12:00 p.m.	Abstract Presentations
12:00–12:15 p.m.	Closing Remarks, Evaluation, Adjourn

Letter from the President

I hope this newsletter finds you all well. It has been a busy time for LLRS: we've just come off a highly successful Specialty Day meeting, planning for the 14th Annual Scientific Meeting in Toronto is in full swing, and arrangements for the 15th annual meeting have also begun, believe it or not!

Our Society Treasurer, Rob Rozbruch put together an excellent program for Specialty Day at AAOS in San Francisco. He invited speakers for four symposia on Trauma, Foot and Ankle, Tumor, and Pediatric subjects. A "Best Papers from LLRS-Boston" and Special Interest sessions rounded out the day. Registration increased nearly 50% from our previous two Specialty Days, and the program was very well received. Congratulations to Rob are in order, as are thanks: he has agreed to co-chair next year's Specialty Day program, along with David Feldman. Save the date: February 26, 2005, during AAOS in Washington, DC. I'm certain the program will be better yet.

I have confirmed two guest speakers for the 14th Annual Scientific Meeting in Toronto Friday through Sunday, July 23–25, 2004. Professor Hiroyuki Tsuchiya from Kanazawa, Japan will be the Codivilla Lecturer. You may recognize the name: he was a speaker at the 2001 meeting, and gave two presentations at this year's specialty day. However, his address, "Biological Reconstruction after Bone Tumor Surgery" includes demonstrations of exciting reconstructive procedures that he has not shown LLRS before. This is a do-not-miss address.

The Presidential Guest Speaker is Captain Norman Baker. He is the sole surviving veteran of all three Thor Heyerdahl reed vessel expeditions (*Ra I* and *II* sailed from Morocco to Barbados, and *Tigris* was navigated from the cradle of civilization around the Arabian peninsula to Pakistan and Africa). You may remember that it was Yuri Senkevitch, Russian physician, who guided Carlo Mauri after the *Tigris* expedition to Ilizarov for treatment of his tibial and foot deformities. Mauri in turn assisted the Lecco surgeons including Roberto Cattaneo, Maurizio Catagni, and Angelo Villa to learn of Ilizarov and his method. Captain Baker will show movies and images of these adventures, give us a view of the personalities of the crew, and speak about Mauri's deformity. *The RA Expeditions* and *Tigris* by Heyerdahl make for fascinating background reading for Captain Baker's address.

The afternoon sessions will be devoted to moderator/panel case presentations and "Master's Demonstrations" on Taylor Spatial Frame, "MAC" Multi-Axial Correction System, and ISKD nail applications. The abstracts are in, the program is set, make your plans to attend the 14th Annual Meeting in Toronto!

Finally, we have confirmed the date and location for the 15th Annual meeting: it will be held at the Grand Hyatt Hotel in New York City Friday through Sunday, July 29–31, 2005. Will Mackenzie will be the President and Jim Hutson the Program Chair for this meeting.

See you in Toronto!

John Birch

Abstracts in A Minute

The purpose of Abstracts in A Minute is to facilitate members' self-study. Because of the brevity, these abstracts are not intended to be an authoritative or critical review.

Trauma – Upper Extremity

Grall G, Gierer P, Ewert A, et al. **Radio-radial external fixation in the treatment of distal radius fractures allows for free wrist motion.** *Zentralbl Chir* 2003; 128:1014–1019. Thirty patients with extra- and intraarticular fractures of the distal radius were treated with a modified Ilizarov hybrid fixator. The fixator allowed free wrist motion. Anatomic reduction was achieved in 80%. All healed within 6 weeks. Wrist motion was more than 80% of the unaffected side.

Johnson D, Tiernan E, Richards AM, Cole RP. **Dynamic external fixation for complex intraarticular phalangeal fractures.** *J Hand Surg [Br]* 2004; 29:76–81. This article reviews 15 patients with fractures affecting the MCP, PIP, and DIP joints. A dynamic external spring fixator was used. In three cases, the device spanned two adjacent joints. Long-term follow up showed no major complications and excellent range of motion.

Ruch DS, Yang C, Smith BP. **Results of palmar plating of the lunate facet combined with external fixation for the treatment of high-energy compression fractures of the distal radius.** *J Orthop Trauma* 2004; 18:28–33. Twenty-one patients with high-energy compression-type injury to the distal radius were reviewed. Criteria included age between 18 and 65 years with no evidence of concomitant metabolic bone disease and a 3- or 4-part compression type of injury of the distal radius with residual displacement of the palmar lunate facet despite reduction of the dorsal cortex by application of an external fixator. This technique permits visualization and reduction of the palmar lunate facet and reduction of the palmar tilt to neutral tilt without significant radial shortening.

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Yamamoto K, Masaoka T, Shishido T, Imakiire A. **Clinical results of external fixation for unstable Colles' fractures.** *Hand Surg* 2003; 8:193–200. This study reviewed 92 Colles' intraarticular or unstable fractures in 88 patients treated with a Pennig external fixator. Radiologic measurements at follow up included volar tilt (VT), radial inclination (RI), radial length (RL), and ulnar variance (UV). Excellent and good results were obtained in 95.6%. Cases with die-punch lesions had poorer results. Redisplacement was observed in patients over 50 years old. UV tended to increase and RL tended to decrease in the early exercise group (three weeks after surgery). 32.2% of those with ununited ulnar styloid fractures had pain. Osteoarthritic changes were seen in 2/11 wrists with a step off of 1–2 mm or larger. In order to maintain the reduction position, it was important to determine the appropriate time for initiating exercise depending on the degree of fixation. The step off of the articular surface should be less than 1 mm. Fixation for ulnar styloid fractures should be performed.

Trauma – Lower Extremity

Lerner A, Stein H. **Hybrid thin wire external fixation: an effective, minimally invasive, modular surgical tool for the stabilization of periarticular fractures.** *Orthopedics* 2004; 27:59–62. Hybrid thin wire external fixation offers advantages in stabilization of periarticular, supracondylar, and pilon fractures: it is minimally invasive, it preserves the soft tissue envelope, and it permits early loading and mobilization.

Roukis TS, Landsman AS, Leone E. **Toe reconstruction following a lawnmower injury using a distally based adipofascial turnover flap and distraction osteogenesis.** *Plast Reconstr Surg* 2004; 113:793–795. Case report of 42-year-old man who sustained fractures of 2–4 toes and full thickness skin loss on dorsum of toes 2&3 due to lawnmower. Toes were stabilized with small AO (Synthes) fixators. Soft tissue coverage was performed 5 days later. Four weeks later, lengthening was begun with a mini-rail Orthofix fixator on proximal phalanx of great toe and Pennig (Orthofix) minifixator for the third toe proximal phalanx. Total length obtained was 13mm for great toe and 15mm for third toe.

Talarico LM, Vito GR, Zyryanov SY. **Management of displaced intraarticular calcaneal fractures by using external ring fixation, minimally invasive open reduction, and early weightbearing.** *J Foot Ankle Surg* 2004; 43:43–50. Review of 23 patients with 25 intraarticular fractures of the calcaneus, treated with minimally invasive open reduction of the posterior facet through a lateral approach and skeletal traction with an external ring fixator. Time in the frame averaged 6.6 (range 5–9) weeks. Mean age was 43.8 (range 22–68) years. Using the Sanders CT classification, there were 17 type II, 6 type III, and 2 type IV fracture patterns. Follow up was 2–7 years. Thirty-five percent had diffuse rear foot pain; 17% had plantar heel pain. Subtalar motion was >50% in 21 of 25 fractures. There were no deep infections. Authors conclude that this technique is a viable alternative to the traditional ORIF method.

Bari MM, Ahmed MU, Hossain MB, et al. **Treatment of non union of humerus using G. A. Ilizarov technique.** *Mymensingh Med J* 2004; 13:36–38. Article reviews a series of 36 cases of humeral nonunions, which had been previously treated with internal fixation. Ages ranged from 21 to 62 (mean = 32) years. Union was achieved in all 36 cases, with good elbow and shoulder motion.

Barker KL, Lamb SE, Simpson AH. **Functional recovery in patients with nonunion treated with the Ilizarov technique.** *J Bone Joint Surg [Br]* 2004; 86:81–85. This is a prospective study of 40 consecutive cases of lower extremity nonunions (31 tibias, 9 femurs). Mean time from injury to Ilizarov procedure was 2 years, 11 months (range 5–134). Functional recovery was quantified by three timed activities (walking speed for 20 m, standing from a seat 49 cm from the ground, and number of stairs climbed in a 60-second period). The Toronto Extremity Salvage Score (TESS) was used to identify physical disability based on patients' descriptions. Testing was done the day before surgery and at 6, 12, 24, and 30 months after external fixator removal. Recovery was slowest in the early stages after removal and greatest between six months and one year. Statistically significant improvement continued up to, but not beyond, two years.

DeCoster TA, Gehlert RJ, Mikola EA, Pirela-Cruz MA. **Management of posttraumatic segmental bone defects.** *J Am Acad Orthop Surg* 2004; 12:28–38. Review article of pros and cons of techniques used for segmental defect treatment. Massive cancellous autografts, with or without limb shortening and/or fibula pro tibia was used as an alternative to amputation in World War II. Early amputation is often superior to prolonged attempts at salvage, especially in 10–30 cm defects. Distraction osteogenesis is the leading option for defects 2–10 cm. Free vascularized bone transfer has been suggested for 5–12 cm defects, but hypertrophy is unreliable and fractures are common. Autologous nonvascularized cancellous bone graft requires skeletal stabilization; a graft can unite the ununited tibial segments to the fibula. Newer techniques, including titanium cages with bone graft material, synthetic bone graft substitutes, bone morphogenic proteins, and gene therapy are also discussed.

Garcia-Cimbrello E, Marti-Gonzalez JC. **Circular external fixation in tibial nonunions.** *Clin Orthop* 2004; 419:65–70. This article reviews 45 tibial nonunions without bone defect and 37 tibial nonunions with bone defect requiring resection followed by lengthening or bone transport. Healing was obtained in 39 out of 45 without bone defect (mean healing 5.4, range 3–13 months) and in all patients with bony defect, although 23 of these 37 required secondary procedures (healing time, mean 12.9, range 5–22 months). Infection was eradicated in all infected cases. Final mean leg length discrepancy was 0.7 cm in those without bone defect; 2.03 cm in those with bone defect. Time between fracture and surgery averaged 10.7 (range 3–68) months.



Limb Lengthening and Reconstruction Society:
ASAMI-North America

14th Annual Scientific Meeting
Friday-Sunday, July 23-25, 2004
Delta Chelsea Hotel
Toronto, Ontario, CANADA

For information:

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Lerner A, Herer D, Chezar A, et al. **Treatment of nonunions with irretrievable broken nail pieces in the distal fragment.** *Arch Orthop Trauma Surg* 2004; 124:151–153. Authors report two patients treated with Ilizarov external fixation for nonunions with a broken intramedullary nail retained in the distal fragment. Full weight bearing was achieved immediately after surgery. Nonunions healed in 16 and 22 weeks with no complications. Authors concluded that ring fixation with wires or half pins inserted beside fragments of a broken nail provides a simple method of treatment when encountering difficulties extracting a retained fragment of a broken intramedullary nail.

Mekhail AO, Abraham E, Gruber B, Gonzalez M. **Bone transport in the management of posttraumatic bone defects in the lower extremity.** *J Trauma* 2004; 56:368–378. Retrospective review of 19 patients treated by internal bone transport using the Ilizarov technique. Mean time in external fixator was 13.8 months. Mean length of regenerate was 5.7 (0.8–20.4) cm. The SPF–36 Health Survey showed a significant difference between the population norm and the mean of the study group in Physical Functioning, Bodily Pain, and Role–Emotional. Their general, social, and mental health is usually not affected. Infection significantly increased the healing index. The limb should be protected for a long time after fixator removal to avoid fracture at the docking site.

Deformity Correction

Cordonnier D, Barbier J, Desrousseaux JF. **Severe angular deformity of the humerus: unilateral external fixation for correction and bone lengthening.** *Rev Chir Orthop Reparatrice Appar Mot* 2004; 90:83–87. Case report of a lengthening and deformity correction of the humerus in a ten-year-old child who had deformity and shortening due to post-traumatic proximal epiphyseodesis of the humerus. Lengthening and deformity correction were performed with the Orthofix LRS system. A proximal epiphyseodesis was performed after 6 cm of lengthening to prevent recurrence.

Oznur A, Tokgozoglul M. **Closure of central defects of the forefoot with external fixation: a case report.** *J Foot Ankle Surg* 2004; 43:56–59. Case report of the use of an Ilizarov fixator to close the defect following resection of the central rays in a patient with diabetes. Fixator was worn for eight weeks.

Talarico LM, Vito GR. **Triple arthrodesis using external ring fixation and arched-wire compression: an evaluation of 87 patients.** *J Am Podiatr Med Assoc* 2004; 94:12–21. Authors review 87 patients who underwent triple arthrodesis with external rings and arched-wire compression for fixation. Eighty-four (97%) achieved clinical and radiographic fusion in 6–8 weeks. Thirty-six percent developed a superficial implant infection. Nine (10%) cases experienced wound dehiscence. Three (3%) developed a nonunion.

Zgonis T, Jolly GP, Blume P. **External fixation use in arthrodesis of the foot and ankle.** *Clin Podiatr Med Surg* 2004; 21:1–15. Article on advantages, disadvantages, and indications for external fixation in the treatment of complex foot deformities.

Lengthening

Angin S, Unver B, Karastosun V, Ciftci, I. **Dokuz Eylul University (DEU) orthosis: an orthotic method of preventing ankle equinus during tibial lengthening.** *Prosthet Orthot Int* 2003; 27:238–241. Article describes a detachable AFO attached to the distal ring of an Ilizarov external fixator during tibial lengthening. It avoids the need for heel cord lengthening and prophylactic fixation of the foot. It is removable for therapy.

Hankemeier S, Pape HC, Gosling T, et al. **Improved comfort in lower limb lengthening with the intramedullary skeletal kinetic distractor: Principles and preliminary clinical experiences.** *Arch Orthop Trauma Surg* 2004; 124:129–133. Review of 4 patients treated with the internal lengthening ISKD. Mean age was 29 years. There were three femurs and one tibia. Average lengthening was 31mm (range 26–40). One patient took mild analgesics; three required none. Planned lengthening was achieved in all cases. Full weightbearing was achieved after 10 (range 7–14) weeks. Average consolidation index was 2.9 days/mm. No complications were observed in follow-up period of 14 months. Authors conclude that the ISKD has advantages: no fixator-associated complications, well tolerated by patients, full weightbearing, and excellent limb motion.

Research

Davison BL, Cantu RV, Van Woerkom S. **The magnetic attraction of lower extremity external fixators in an MRI suite.** *J Orthop Trauma* 2004; 18:24–27. Magnetic attraction and presence of temperature elevation were measured during a 30-minute MRI scan of ten lower extremity external fixators attached to saw bone tibias. The Ilizarov fixator with carbon fiber rings, Richards Hex-Fix, and large Synthes external fixator had <1 kg magnetic attraction. No component experienced >2 degrees of temperature elevation. Other fixators tested had >1 kg magnetic attraction. Fixators that have <1 kg of attraction do not experience significant heating during MRI.

Thank you
Smith & Nephew Inc.
for the in-kind donation of
printing and shipping
the Specialty Day 2004 Programs

Research continued

Leung KS, Cheung WH, Yeung HY, et al. **Effect of weightbearing on bone formation during distraction osteogenesis.** *Clin Orthop* 2004; 419:251–257. The effect of weightbearing on bone formation was studied by performing an osteotomy and distraction on 24 goats. Twelve were allowed to bear weight; 12 were non-weightbearing. Bone formation was monitored by serial radiographs, histologic examination and immunohistochemical study of transforming growth factor- β 1 expression. Bone formation, as seen by radiography and histologic studies, was better quantitatively and qualitatively in the weightbearing group. There was significantly greater TGF- β 1 expression in the weightbearing group. Authors conclude that early weightbearing during distraction osteogenesis should be reinforced. Distraction provides pulsed form stimulation by tension across the osteotomy and initiates osteogenesis while the compressive stress exerted by the weightbearing is continuous in daily activities and enhances new bone formation.

Mark H, Nilsson A, Nannmark U, Rydevik B. **Effects of fracture fixation stability on ossification in healing fractures.** *Clin Orthop* 2004; 419:245–250. Study of temporal distribution of intramembranous and endochondral bone formation as a function of fracture gap and external fixation rigidity in rats. Less rigidity and increased fracture gap induced a later response of bone formation, greater endochondral bone formation and prolonged time to full ossification. In the early phase of fracture healing, the temporal distribution and histologic characteristics of periosteal and intramedullary bone formation are similar and not influenced by rigidity or fracture environment. If tissues in the intramedullary region are preserved, intramedullary bone formation is substantial. Woven bone might be a prerequisite for the differentiation process of endochondral bone formation.

Mizuta H, Nakamura E, Mizumoto Y, et al. **Effect of distraction frequency on bone formation during bone lengthening: a study in chickens.** *Acta Orthop Scand* 2003; 74:709–713. Bone formation was compared in two groups of chickens undergoing tibial lengthening. Fifteen chickens underwent lengthening at 0.75 mm/day in two steps every 12 hours on the right side, and 0.75 mm/day in 120 steps by autodistractor on the left. Bone mineral density was greater in the high-frequency group at all times. Bone formation was faster in the high-frequency group. On the two-step side, endochondral ossification was marked in the early stages of distraction, then intramembranous bone formation became the main mechanism of bone formation. On the high-frequency side, intramembranous bone formation predominated throughout the study.

Rocchio TM, Younes MB, Bronson DG, Birch JG, Samchukov ML. **Mechanical effect of posterior wire or half-pin configuration on stabilization utilizing a model of circular external fixation of the foot.** *Foot Ankle Int* 2004; 25:136–143. Study of fixation configurations in a simulated foot model using tensioned stopper wires or half-pins. Although the wire-cross angle, half-pin cross angle, and half-pin diameters affect the stability of foot external fixation, the influence of these mechanical parameters on foot stabilization is dependent on mode and localization of loading.

Sakurakichi K, Tsuchiya H, Uehara K, et al. **Effects of timing of low-intensity pulsed ultrasound on distraction osteogenesis.** *J Orthop Res* 2004; 22:395–403. Authors investigated the effects of low-intensity pulsed ultrasound (LIPUS) at three stages of distraction osteogenesis in rabbit tibias. Control group had no LIPUS. Waiting group had LIPUS during 7-day latency period. Lengthening group had LIPUS for 7 days of distraction. Maturation group had LIPUS for the first 7 days after completion of distraction. Bone mineral density, mechanical strength, and histology were performed. The lengthening group had the greatest BMD and mechanical strength. Histologically endochondral bone formation in the lengthening and maturation group occurred earlier than in the control or waiting group. These results suggest that the LIPUS effect is mediated via endochondral pathways. Authors conclude that LIPUS stimulates bone formation in distraction osteogenesis and is most effective during the lengthening phase.

Terheyden H, Wang H, Warnke PH, et al. **Acceleration of callus maturation using rhOP-1 in mandibular distraction osteogenesis in a rat model.** *Int J Oral Maxillofac Surg* 2003; 32:528–533. Seven adult rats underwent mandibular distraction at 0.7 mm per day. rhOP-1 was injected directly into the callus; the contralateral side received saline as a control. Animals were sacrificed at 4 weeks after completion of distraction. The rhOP-1 side had a significantly higher bending rigidity and continuous bony bridging not seen in the controls. rhOP-1 may be an option to accelerate callus maturation in mandibular distraction osteogenesis.

Other

Catagni MA, Guerreschi F, Lovisetti L, Singhania AK. **Use of the Ilizarov technique to improve limb function following hemipelvectomy. A case report.** *Chir Organi Mov* 2003; 88:171–178. Case report of the use of the Ilizarov technique as a second stage adjunct for the improvement of function after first stage tumor resection and arthrodesis. This two-stage procedure is suitable for patients with tumor-free survival and is an alternative to a mammoth one-stage procedure.

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Heini PF, Gahrlich U, Orler R. **The external fixator: a tool for evaluation of complex low back pain problems.** *J Spinal Disord Tech* 2004; 17:8–14. This is a retrospective study of 63 patients, treated with external fixation to clarify if temporary back pain relief by external fixation is predictive for back pain relief after final internal fixation and fusion. A positive test fixation means a 72% chance for a satisfactory outcome at least 2 years after surgery, whereas without surgery, the chance for some spontaneous improvement is 57% if the test immobilization did show some improvement. With respect to the “negative” selection of this group of patients (complex history, previous intervention), the obtained results seem acceptable and the use of this invasive diagnostic measure in this group of patients seems justified. Because of the risk and expense of external fixation, it is only justified when other methods fail to evaluate a patient’s situation. If the test fixation reveals no benefit, the patient will obtain no benefit whatever therapeutic methods are used.

Inda DJ, Blyakher A, O’Malley MJ, Rozbruch SR. **Distraction arthroplasty for ankle using the Ilizarov frame.** *Tech Foot Ankle Surg* 2003; 2(4): 249–253. Review of nine patients who underwent distraction of the ankle for ankle arthritis using the Ilizarov fixator. Indications, preoperative planning, technique, and results are reviewed. Distraction arthroplasty is based on mechanical unloading of the joint and maintenance of intraarticular intermittent flow. Procedure is indicated for patients who have failed conservative treatment and would otherwise undergo arthrodesis or arthroplasty. Hinge is constructed with two universal hinges collinear with oblique axis of ankle. Other procedures performed simultaneously include ankle arthroscopy (3), ankle arthrotomy (2), and percutaneous TAL (2). Wider joint space and improvement in pain were obtained in all nine patients.

Lee V, Srivastava A, PalaniKumar C, Daniel AJ, Mathews V, Babu N, Chandy M, Sundararaj GD. **External fixators in haemophilia.** *Haemophilia* 2004; 10:52–57. This article reviews 9 patients with external fixation for arthrodesis of infected joints, treatment of open fractures, and osteoclasia. Fixators included Ilizarov, AO, and Chamley frames. Mean age was 19.2 (range 9–37) years. External fixation required an average of 9 (range 4–17) skin punctures. Frames were worn for an average of 15 (range 8–29.5) weeks, without regular factor replacement until frame removal with a single dose of factor infusion. Mean preoperative factor level was 85% (range 64–102%). Average total factor consumption was 430 IU/kg (range 240–870), administered over a period of 17 (range 9–44) days. The only major complication was development of inhibitors in one patient. Authors conclude that external fixation can be used safely in haemophilic patients who do not have inhibitors and do not require prolonged factor replacement.

Temple J, Santy J. **Pin site care for preventing infections associated with external bone fixators and pins.** *Cochrane Database Syst Rev* 2004; CD004551. This literature review found only one randomized controlled trial to evaluate implant hygiene. Only one trial was eligible for inclusion, comparing cleaning with 0.9% saline, with alcohol, and no cleaning. There were the fewest infections in those which had not been cleansed. Clearly there is a need for large randomized controlled trials.

W–Dahl A, Toksvig–Larsen S, Lindstrand A. **No difference between daily and weekly pin site care: a randomized study of 50 patients with external fixation.** *Acta Orthop Scand* 2003; 74:704–708. Authors studied whether there was a difference in frequency and severity of pin site infection when pin site care was performed daily or weekly. Fifty patients were prospectively randomized to daily or weekly pin care. All patients underwent hemicallosis for gonarthrosis with HA–coated metaphyseal pins and standard pins in the diaphyseal bone. There was no difference between daily versus weekly pin care with regard to frequency or severity of pin site infections, pain, or use of antibiotics or analgesics. Most frequent organisms were coagulase negative staph and corynebacterium. Antibiotics were given an average of 47 days.

Educational Opportunities

May 27–29, 2004
Third International ASAMI Meeting
Istanbul, Turkey
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July 23–25, 2004
14th Annual Scientific Meeting of LLRS
Toronto, Ontario, Canada
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August 4–8, 2004
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