

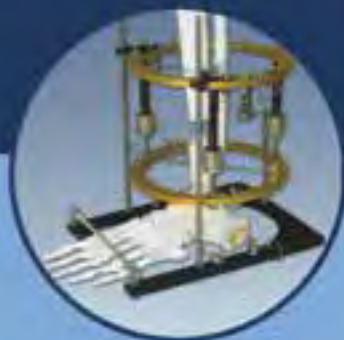
Orthopaedic Product News

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SMALL BONE INNOVATIONS

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Dr. S. Robert Rozbruch's 17 years of service as an orthopaedic surgeon began as a graduate with honors in research from Cornell University Medical College in 1990 and included a Limb Lengthening and Deformity Correction Fellowship at the Maryland Center for Limb Lengthening and Reconstruction; AO/ASIF Orthopaedic Trauma Fellowship, University of Bern, Switzerland; Residency in Orthopaedic Surgery at the Hospital for Special Surgery, Cornell University; an Internship in General Surgery, North Shore University Hospital. Dr. Rozbruch has been instructing at the Weill Medical College of Cornell University for the past ten years. He is currently an Assistant Professor of Orthopaedic Surgery at Weill Medical College of Cornell University.

Dr. Rozbruch spends the majority of his time in a hospital-based practice in orthopaedic surgery with specializations in Limb Lengthening and Deformity Correction, Trauma and Reconstruction, and he also makes time to instruct courses in limb lengthening and trauma; conduct or supervise research in trauma, limb lengthening and deformity correction; provide clinical instruction and research supervision to medical student residents and fellows; and serve on committees and boards for the Hospital for Special Surgery, industry societies and publications. Dr. Rozbruch also has published over 20 articles, more than ten book chapters, and presented greater than 100 posters or lectures at various symposiums. *U.S. Orthopaedic Product News* spoke with him recently.

U.S. Orthopaedic Product News (OPN): How do you decide when it is most appropriate to use external fixation, and when do you feel internal fixation is a better treatment option?

S. Robert Rozbruch, M.D. (SRR): I choose external fixation for two distinct conditions. The first is in the presence of infection, or when operating on a patient with a high potential for infection. A patient with a chronic history of infection from prior procedures is an external fixation candidate. As external fixation requires minimal skin incision, I feel that there is a reduced rate of complication as opposed to other methods. The second condition pertains to patients with a poor soft tissue envelope, as they are highly susceptible to complication. It has been well documented that performing a highly invasive procedure on a patient with a poor soft tissue envelope can result in massive complications, occasionally leading to measures as serious as amputation.

In first time surgical candidates who are not susceptible to infection, who have "normal" (un-inflamed or not recently operated on) soft tissue, internal fixation is a good viable option. For more challenging patients demonstrating higher potential risk, external fixation is the option I prefer.

External fixation is often used when deformity correction or fracture management need added stability. External fixation also provides the patient with the option, in controlled situations, of partial or full weight bearing.

OPN: *In which procedures do you most commonly utilize external fixation?*

SRR: External fixation can be used for most orthopaedic applications: charcot reconstruction, fracture management, arthritis, arthrodesis, deformity correction. I most commonly use it for lengthening of limbs, gradual deformity correction or joint distraction.

In my experience, circular external fixation is the best device on the market for performing limb lengthening. My feelings largely stem from the continual need to lengthen the bone via the fixator during the callus bone healing stage. After the first one to two weeks (when the bone becomes callus), the patient will need daily frame adjustments for several weeks depending on the amount of correction sought. Adjustment stops

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once the desired correction is attained. For limb lengthening, external circular fixation can be used for upper (humerus, radius, ulna) or lower limbs (femur, tibia, metatarsals), and can be done on children and adults alike.

Like most surgeons, I perform many of my small deformity corrections acutely using internal fixation. For larger deformity corrections, I prefer to use an external fixator and perform the correction gradually. This is required in order to avoid significant soft tissue complication. Nerve palsy could be a complication if a large angular correction is made acutely.

Lastly, distraction arthroplasty (arthrodiastasis) is a growing trend, and many surgeons are experiencing positive results. Ankle distraction in particular is a procedure that I am performing regularly with excellent results.

OPN: *What are the advantages of using circular vs. unilateral external fixation?*

SRR: Circular fixation provides the opportunity to treat multiple deformities, it provides excellent stability through multi-planar fixation, meaning that deformities in different planes or different bones/joints can be treated simultaneously with the same ring fixator.

The system is very versatile and modular, allowing multiple levels to be addressed. For example, I can correct a deformity at the ankle and lengthen the leg below the knee simultaneously. Another example of this is for post-traumatic reconstruction of a patient with a segmental loss. The proximal tibia and foot can be fixated, while a segment of the tibia is transported distally until it docks with the talus.

Among the most powerful benefits to external fixation is the ability to adjust the frame post-op. This is a tremendous benefit in lower extremity applications. The patient's skeletal anatomy always looks different when they are weight bearing as opposed to non-weight bearing.

OPN: *What is ankle distraction arthroplasty?*

SRR: An ankle distraction is the application of an external fixator which spans the ankle joint, providing the patient with the ability to bear weight and have ankle motion while providing distraction. In using the fixator to distract across the ankle joint, the joint itself can be stretched and offloaded (the talus from the distal tibia). This creates a biomechanical environment that helps stimulate cartilage regeneration.

OPN: *What are your outcomes for ankle arthrodiastasis?*

SRR: My results for ankle arthrodiastasis have been excellent. The procedures have allowed 90% of our patients to avoid the need for ankle fusion, which allows them much greater mobility and motion. I base this statement on a three to five year follow-up of patients that I have treated. I have also noticed that the patients tend to improve over time.

OPN: *Generally speaking, how many ankle arthrodiastasis cases are performed?*

SRR: This is still a relatively underused procedure which will grow in the near future. Ankle arthrodiastasis is indicated for patients with moderate arthritis and mobility of the joint. Distraction of the ankle is done to correct ankle contractures. It will be used more often as an adjunctive to ankle arthroscopy when treating patients for arthrosis with debridement and microfracture.

OPN: *Why use an external circular fixator for ankle fusion when you could use screw fixation on the inside?*

SRR: External fixation is the ideal choice for complex ankle fusion when screw fixation is not adequate. Examples of this are cases where the patient has bone loss, irregular bony surfaces, the presence or history of infection, significant deformity or cases requiring simultaneous lengthening. Through the use of wire fixation, a circular fixator also provides a more dynamic form of fixation helping to avoid potential stress-shielding or a failed fusion. As stated previously, circular fixation supports patient weight bearing more safely than internal fixation alone. Recent journal articles also cite better stability in revision ankle arthrodesis with circular fixators over plating or intramedullary nailing.

OPN: *What are your outcomes for ankle fusion?*

SRR: In patients where an ankle arthrodiastasis is not an option, I have performed ankle fusions. To date my results have been excellent in performing ankle fusions with a 90% success rate in complex cases. (Complex is defined as screw fixation not being adequate.)

OPN: *What is the size of the complex ankle fusion market?*

SRR: With increasing high energy trauma to the foot and ankle combined with overall patient survival, there will be an increasing number of failed pilon fractures and post-traumatic ankle problems. The failures often result in infection, contracture, bone loss and poor skin. This is the complex ankle fusion market. Pilon fractures are among the most common fracture in the U.S., second only to distal radius fractures.

These numbers will increase due to an aging population and increased preservation of high energy limb trauma with later reconstruction needs. Also, diabetic complications are increasing in epidemic proportions and the ankle and hindfoot joints are prime targets of this disease.

OPN: *How important is patient opinion of the frame in determining whether you will use it?*

SRR: The patient's input is very important. Many of my patients have been educated about the positive benefits of frame (external fixation) treatment and seek out our treatment. If patients are familiar and knowledgeable about the positive aspects of external fixation, it is easier to recommend and be accepted by the patient. Patient acceptance is tied directly to patient compliance, which is a key requirement for a successful outcome.

OPN: *Is there patient resistance to wearing an external device, and if so, how do you address it?*

SRR: While some patients are resistant, others are particularly interested in it. Generally if patients have been informed about the positive benefits of external fixation or have had a bad experience with internal fixation, they are more prone to accept recommendations for external fixation.

I inform each patient about what I think is the best treatment for himself. With education about the benefits of external fixation patient acceptance comes more readily. This is easiest in cases where external fixation is really needed (e.g. lengthening, complex fusions, infections, deformity, contractures, distraction arthroplasty).

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