ROUNDTABLE DISCUSSION

# Incorporating TRA Into Your Lower Extremity Interventional Practice

Practical advice from a United States center leading the charge toward the transradial approach.

**WITH AARON FISCHMAN, MD, FSIR; RAHUL S. PATEL, MD, FSIR; AND RAMI TADROS, MD, FACS, RPVI**


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**As a high-volume transradial access (TRA)–leaning group with multiple operators entering the practice at different times, how do you think the learning curve has (or has not) changed for new operators adopting TRA?**

**Dr. Patel:** As our lab has almost fully adopted a radial-first approach for nearly all appropriate cases, the learning curve has gone down. This learning curve doesn't just involve the operator, but also the staff, from the technologists to the circulating nurses and recovery nurses. This team approach significantly helps new operators get up to speed quickly.

**Dr. Fischman:** It is easier these days to learn TRA because there are so many resources: articles (both peer reviewed and not), video guides, live cases, and teaching courses, many of which are online. There is a significant learning curve with TRA, but overcoming that curve is much easier than it used to be.

### How many cases does it take for the average operator to become proficient with TRA?

**Dr. Tadros:** Proficiency depends on what's being treated and the person's baseline endovascular ability. If simply performing a diagnostic procedure, it may take as few as five. More complex cases may take 25 to 50 cases.

**Dr. Fischman:** In my view, it takes about 50 cases to become proficient. There are just so many things to learn regarding this access site compared with a femoral approach. I am still learning to a certain degree, and my group has performed more than 8,000 cases.

**Dr. Patel:** For most visceral interventions, I've found that the learning curve isn't as steep as what is reported for cardiac interventions. Within our training program, the learning curve is about five to 10 cases to become comfortable with accessing the radial artery, navigating the arch, and selecting the target artery. To become truly proficient (ie, the ability to deal with all of the potential pitfalls and complications) likely requires around 25 to 50 cases.

### What are your top reading recommendations from the literature to inform those wanting to learn more about TRA for lower extremity interventions?

**Dr. Tadros:** With others at Mount Sinai, I published an article in *Surgical Technology International* that provides an excellent review of this topic.[1]

**Dr. Fischman:** Dr. Patel and I also were coauthors on a review article on TRA for lower extremity interventions, which was published in *Seminars in Interventional Radiology* in 2018.[2] The article hashes out what we can and cannot do with TRA for lower extremity interventions. The topic is a moving target, but this is a good start to get some basic tips and tricks. Our website (www.treatsymposium.org) also has a publications section with helpful articles for understanding how TRA can fit into your practice.

### What are the most and least effective training methods for achieving TRA proficiency?

**Dr. Patel:** Terumo Interventional Systems and Merit Medical Systems, Inc. both offer in-person multiple-day and half-day training courses that include hands-on practicum and didactic lectures. These are a great way to learn TRA techniques, especially when starting from scratch. We also offer a yearly multidisciplinary (interventional radiology [IR], vascular surgery, and neuroendovascular surgery) course at Mount Sinai called TREAT that shows the intricacies of more complex interventions through live cases.

**Dr. Fischman:** I have run the TREAT live training course at Mount Sinai for many years. This is a very effective training method combining didactics, hands-on experience, and live discussions during live cases. Most who attend this 1.5-day course feel comfortable with TRA and go home with the tools for integrating TRA into their practices right away. Live cases are a great resource for learning new techniques and how to implement them. The least effective method is thinking TRA is the same as femoral access and performing it without first educating yourself appropriately in the technique. That is how complications occur, which is not good for anyone.

**Dr. Tadros:** Hands-on training in a live course is best. Once the foundation is built, diagnostic procedures and straightforward interventions are the next steps in gaining proficiency. Once basic skills have been solidified, more advanced interventions can be attempted. The least effective method is anything that doesn't incorporate hands-on training.

### What do you recommend as the ideal first cases for TRA adoption?

**Dr. Fischman:** In IR, I have always said that interventional oncology cases such as chemoembolization and radioembolization are the best to start with. This is mostly because catheter length typically is not an issue, and the access is usually straightforward because these patients often do not have significant vascular disease.

**Dr. Tadros:** When the diagnostic procedures have been mastered, moving on to interventions for short-segment stenoses in the proximal to mid superficial femoral artery (SFA) is ideal. I would avoid total occlusions and multilevel disease early on.

**Dr. Patel:** Within IR, I think uterine fibroid embolization is a good place to start, with some caveats. Young women tend to have more straightforward arch anatomy, catheter length is not an issue, and the patient benefits are easy to explain (faster ambulation/sit-up times, no groin puncture). However, these patients tend to have smaller radial arteries that also may be more prone to spasm. Good technique (single-wall puncture, good hydration, radial cocktail, and adequate sedation) is paramount to help mitigate the risk of spasm and radial artery occlusion.

### How do cath lab staff respond to TRA, and what additional support staff training is required to adopt this approach?

**Dr. Patel:** Nurses and staff love TRA because recovery times are shorter and easier for patients. Nurses are

happy because their patients are happier, and they don't have to watch patients to make sure they lay flat or bend their legs. The nurses feel more engaged with the patient when they are the ones removing the TR Band hemostasis device (Terumo Interventional Systems).

**Dr. Fischman:** Along with the nurses, as Dr. Patel mentioned, technologists also feel very engaged with TRA. As long as they are aware of the different types of access sites for each case, they can adequately prepare the room, the equipment, and the patient. There is no need for special support staff.

**Dr. Tadros:** The staff responds favorably because the complications after TRA are fewer and the patients are more comfortable. Further, it allows for a more rapid discharge compared with transfemoral access (TFA). The staffing needs are identical or less than those for TFA—although some additional training may be needed to educate staff on using nitroglycerin paste, TR Bands, and an intraoperative cocktail of intraradial nitroglycerin, verapamil, and heparin.

**When undertaking TRA, what backup strategies and tools do you have in place should you need to abandon the radial approach, and when do you personally know it is time to make this change?**

**Dr. Fischman:** People always ask me, "Do you prep the groin in every case?" My answer is no. To be successful at TRA, my view is that you should not lean on femoral access as a crutch. Become proficient, but don't be afraid to crossover to femoral if you have to. It takes a few minutes to switch over; if I'm using the left wrist and need to switch, I'll use the left groin because it's right there—no problem whatsoever.

**Dr. Patel:** With TRA, our back up would be TFA; but in reality, our crossover rate is extremely low, and we do not prep the groin unless TRA has failed. We have found that as you become more proficient with TRA, the crossover rate drops quickly.

**Dr. Tadros:** Alternate arterial access should be considered as a bailout and thought of in advance. Antegrade or retrograde femoral access should be considered first when feasible. When TFA is not possible, brachial access is a great alternative. Occasionally, direct pedal access and transpedal intervention can be considered in certain populations, but it should be reserved for critical limb ischemia (CLI) and when alternate access is not available. When performing transpedal interventions, I always prefer to have a second access to ensure hemostasis and patency of the accessed pedal vessel. A transpedal intervention can rarely be performed as a single access.

**There seem to be differing views among TRA operators as to the viability of the Barbeau test to guide patient candidacy, with some using it to guide practice and others strictly staying with the recent American Heart Association recommendation against its use for this purpose. Can you discuss why you do or do not use this test in your practice?**

**Dr. Fischman:** This is a good point. Do I use Barbeau D waveform as an absolute contraindication to TRA? No. I completely understand why people believe this doesn't correlate with potential hand ischemia. However, the Barbeau test typically takes a few seconds and gives me information about the palmar hand circulation. I like to have this information. I use ultrasound in addition to Barbeau to better understand vessel size, tortuosity, and contribution to circulation in the hand. Why not have more information to decide the best access site? I have never had a case of hand ischemia using these concepts, and I want to keep it that way.

**Dr. Patel:** We perform a Barbeau test in every patient undergoing TRA, but that doesn't mean I won't perform TRA in a Barbeau D patient. In patients with a D waveform, I will evaluate the ulnar artery and the size of the radial artery. Depending on the procedure and sheath size required, I may still perform TRA. In all of my experience, I have never had a case of hand ischemia.

**Dr. Tadros:** I think the Barbeau is a great test that adds objectivity to the Allen test, which can often be subjective. I will avoid radial access in a Barbeau D patient. In this scenario, I check the contralateral radial artery or the ipsilateral ulnar artery, as well as other possible access sites.

**What do you see as the most significant potential benefit of incorporating a TRA approach into lower extremity revascularization, and which types of cases would seem to benefit most?**

**Dr. Tadros:** TRA is one more tool in our armamentarium against peripheral artery disease (PAD). There are many benefits, from improved safety and patient comfort to earlier discharge. It is particularly useful in patients with tortuous iliac arteries or scarring in groins from previous access or surgical procedures. TRA is my go-to after bypass, femoral endarterectomy, or endovascular aneurysm repair (EVAR).

**Dr. Patel:** For patients in whom an up-and-over strategy is not feasible (eg, post-EVAR, severe common femoral artery disease) or an antegrade approach is not safe (eg, in an obese patient), we use TRA for lower extremity revascularization. We tend to stick to relatively straightforward cases because there are some clear limitations regarding the equipment availability (no reentry catheters), but this will hopefully change soon.

**Dr. Fischman:** There are many cases we come across where femoral access is just not feasible (EVAR, occluded femoral arteries). I think if we can become familiar with TRA for more straightforward cases, we will be able to use it when we really need it with greater ease.

## Where do we stand with technology development for TRA access for lower extremity revascularization, and what are the challenges in technology development? Which procedures are not yet within reach?

**Dr. Patel:** Right now, we can treat most TransAtlantic Inter-Society Consensus A/B femoropopliteal lesions. We currently have non–drug-coated balloons and stents, long hydrophilic sheaths, and the Diamondback 360 atherectomy system (Cardiovascular Systems, Inc.). In shorter patients, we may be able to reach infrapopliteal lesions, but TRA is definitely not our go-to for those lesions. We lack crossing catheters and reentry catheters, and we don't have an atherectomy system for in-stent restenosis that will reach from TRA.

**Dr. Tadros:** Industry is certainly taking notice, with Terumo Interventional Systems and Cardiovascular Systems, Inc. developing product lines dedicated to TRA. Although we are better off now than we were a few years ago, we still aren't ready to treat everyone. We need technology that is, at minimum, on par with femoral access. Current needs are improved pushability when crossing occlusions, a wide array of long enough crossing and directional catheters, and wires in varying calibers of sufficient length. Reentry devices currently don't exist but are needed. Offering these products while keeping the French size at a low profile so they can be delivered via TRA is another limitation. Procedures that require reentry devices are not possible. We currently have 200-cm-shaft stents (eg, R2P Misago RX self-expanding peripheral stent, Terumo Interventional Systems) for SFA and popliteal disease, but there are no tibial balloons or stents with shaft lengths longer than 150 cm for treating infrapopliteal disease.

**Dr. Fischman:** We are definitely not there yet. Performing complete CLI cases from TRA only is very challenging, and most operators can't do this with the equipment they have in the lab today. That being said, when we had this conversation a few years ago, there was not much to say. Now, we are least having the conversation and performing the cases!

## What advice would you give those seeking to implement a stronger radial practice in their center, and how do you suggest getting staff and hospital management on board?

**Drs. Patel, Fischman, and Tadros:** Think about why you want to do it. Consider your patients and what they may want, as well as what you would want if you were a patient. Then, get the staff on board and attend a training course. At the training course we run at Mount Sinai, we encourage people to bring at least one member of their support staff. Your radial practice will not get going unless you have buy-in from the nurses and technologists.

The advantages will quickly be recognized by all. Get the team excited about offering this advanced approach to PAD management. Start simple: early successes will help keep everyone motivated. Early failures can be disheartening, which is one more reason to avoid complex cases at first. Straightforward cases will help people see that TRA is doable and better than TFA in many ways. Also, because many of the institutional guidelines are probably already set up by the cath lab team, look into that so you don't repeat work.

If the hospital is not on board, show them the compelling data on direct and indirect cost savings, as well as the patient satisfaction and preference scores. ■

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1. Tadros RO, Prakash VS, Baldwin MJ, et al. The transradial approach for lower extremity vascular intervention. Surg Technol Int. 2018;32:209–217.
2. Posham R, Young LB, Lookstein RA, et al. Radial access for lower extremity peripheral arterial interventions: do we have the tools? Semin Intervent Radiol. 2018;35:427–434.