

Teaching Arthrocentesis and Injection Techniques: What Is the Best Way to Get Our Point Across?



Rheumatologists are recognized for their skill at performing musculoskeletal (MSK) procedures. These skills are honed during fellowship and are further sharpened in clinical practice. We are often called on by our colleagues to assist them in the care of their patients by utilizing our ability to perform MSK procedures. Those of us in academic rheumatology are involved in teaching arthrocentesis and soft-tissue injection techniques to students, residents, and fellows, as well as our colleagues in practice. After 20 years of doing and teaching MSK procedures, I still struggle with what to teach and how to best teach it. I am still trying to figure out how to get the point across!

One of the reasons for my uncertainty is the lack of data to guide us in the development of an appropriate MSK procedure curriculum. Most of us who do this do it by gestalt. Teaching primary care providers to perform MSK procedures will become increasingly important. There is a current and progressive shortage of rheumatologists in both Canada and the US, and the transformation of many rheumatologists from MSK physicians to immunotherapists will further the need for skill transfer to our primary care colleagues to treat common MSK conditions.

We do know that MSK problems are common in primary care. Kahl documented that 23% of clinic visits to a family medicine clinic over a 15-month period were for such issues, with osteoarthritis and regional MSK problems leading the list¹. This is similar to other diagnosis-based primary care practice surveys. In spite of what appears to be a critical need to know how to do MSK procedures, a recent American College of Physicians survey found that there are fewer general internists doing joint aspirations and injection compared to 20 years ago². Seventy-four percent of general internists reported performing such procedures in 1986, compared to only 54% in 2006.

Why are our colleagues in primary care internal medicine doing fewer arthrocenteses and injections? Is it lack of need or lack of training? Although the US Accrediting Council for Graduate Education requires teaching of arthrocentesis and

joint injection for both family medicine and internal medicine residencies, there are no specific joint or soft tissue sites suggested. Accrediting boards for internal medicine such as the American Board of Internal Medicine (ABIM) and the Royal College of Physicians and Surgeons of Canada suggest competency in arthrocentesis but only list knee arthrocentesis as a requirement. The ABIM requires a resident to document that 3 knee arthrocentesis procedures were performed during residency. Hicks, *et al* found that while most internal medicine residents are able to reach the ABIM goal, only 13% of military, 22% of community based, and 11% of university trained residents felt comfortable or very comfortable doing knee arthrocentesis at this requirement level³. It may be that if the accrediting tail did a little more wagging of the residency curriculum dog with regard to MSK procedures, they would get more attention during residency.

The numbers tell us that we have a challenge ahead of us but how do we as rheumatologists turn this into a success? Albert's recent review in *The Journal* on the elements of curriculum mentions 4 elements: curriculum design (content and organization), instructional design (teaching and learning strategies), learners' assessment, and curriculum evaluation⁴. We should become leaders in this area by devising innovative ways to ensure our fellows and residents get the skills they need to care for their future patients.

With regard to curriculum design, it should be relatively easy to develop different practice-specific curricula for different sets of practitioners: rheumatology fellows will need a set of skills different from general internal medicine residents. We do not know exactly which skills a general internist or a family physician will need in practice because there are no practice surveys asking the right questions to tailor a curriculum to their future needs. While we have a good idea what rheumatologists need to know, let's put the question to our primary care colleagues.

Another important issue in curriculum design is procedure technique. The number of rheumatologists doing procedures equals the number of different ways of performing them and

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we can get pretty dogmatic about it as well! Again, there are minimal data to guide us. One of the few studies on technique, done by Jackson, *et al*, found that the lateral midpatellar approach to the knee joint was more accurate than either an anteromedial or anterolateral approach when done by an experienced orthopedic surgeon⁵. As more and more rheumatologists adopt the use of hand-held ultrasound, the issue of technique may be a moot point when we can easily document needle position. For the time being, though, our primary care colleagues will not have this option and best-technique data will be important to those of us thinking about how best to teach these procedures.

With regard to instructional design, in this issue of *The Journal* Jolly and her colleagues report on an instructional program in MSK procedures developed to address a deficiency discovered in their own institution⁶. Jolly and Curran had previously reported that only 19% of their primary care colleagues at their teaching hospital performed MSK procedures⁷. Patients needing procedures were sent to either orthopedics or rheumatology. In response, this group developed a workshop lasting less than 2 hours that included didactics and a hands-on skills session utilizing joint models. They found a significant immediate post-intervention increase in comfort in the participants, and they demonstrated that the intervention had durability with regard to comfort level for the procedures when participants were surveyed 10 months later, an important aspect of any educational intervention. One of the important pieces of this report is the inclusion of primary care faculty in the training, an issue often overlooked. These are the people who will hopefully utilize the procedure skills for their own patients and will influence current and future residents. Several years ago, we reported that residents at times did not perform a procedure because the attending staff in clinic was not comfortable with the procedure⁸.

Jolly and her colleagues should be commended for developing and reporting on their program. I hope we will have additional information forthcoming including data on the change in the number of referrals to orthopedics and rheumatology and number of clinicians doing the procedures after institution of the program.

It would also be interesting to see if the effect of including the faculty in the program could be teased out as well. The 3 elements of a successful educational intervention in medicine should include an immediate improvement in comfort and skill, evidence of durability in these areas, and impact on patient care. This last piece, impact on patient care, is difficult to evaluate, and unfortunately is not often part of educational research design. However, impact on care is the hoped-for outcome for much of what we do in medical education.

What substrate is best with regard to instructional design? Didactics versus models versus cadavers versus 3-D simulators versus mentoring when treating real patients? We have used a cadaver laboratory approach for many years, so I am biased; but I suspect we will find a combination of practice on

something other than real patients, then mentoring on real people that will be most effective; this was demonstrated by Vogelgesang, *et al*⁹. The days of “see one, do one, teach one” are hopefully over, for the sake of our patients (particularly since I am getting to the age where my chances of being a patient are increasing!)

An instructional design to consider as educators in rheumatology is the so-called competency-based education model utilized to teach procedural skills in other disciplines. The basis of competency-based instruction is not adequacy but mastery of a skill prior to “practicing” medicine on real people. In this model, the third element of curriculum design, learner assessment, is based on the individual before and after: 100% competence is the goal rather than applying standard measures of grading educational success.

An example of the competency-based approach was used by Martin, *et al* in teaching fourth-year medical students to do central venous line placement¹⁰. Fresh cadavers were used and students (most of whom do their internship at the same institution) were taught to the point of mastery the placement of central venous lines. The authors note that such a program had a significant impact on patient care. The number of pneumothoraces in their teaching hospital went from an average of 7 during July-September over a 3-year period to 0.5 during the same period for 2 years after the competency-based intervention. What better evaluation of curriculum (the fourth element of curriculum design) could there be than to demonstrate improvement in patient care?

In conclusion, there are plenty of important questions with regard to teaching MSK procedures. I hope Jolly and her colleagues and many others will continue to ask and answer these needed questions to better get our point across.

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