

A New Twist on Nursemaid's Elbow

BY DUSTIN BALLARD, MD, & DAVID VINSON, MD

It's one of the simplest and most satisfying ED patient encounters. *Except when it isn't.* The nursemaid's elbow, also known as radial head subluxation, is usually simple to diagnose and straightforward to fix. *Except when it isn't.* Often (two-thirds of the time, it turns out) there's a classic story that goes with that elbow — "I yanked junior out of the bath by the arm," "big brother swung her around like a helicopter," or "an excess of longitudinal traction was applied to his arm, and this permitted subluxation of the radial head by partially entrapping the annular ligament between the radial head and capitellum."

The next step is usually simple, elegant, and accompanied by a brief episode of crying. *Unless it is not.* For every 10 nursemaid elbow reductions that require only a quick click, there is probably one that does not click so quickly and for which the crying is not so brief.

If only there were solid evidence supporting a fail-proof technique! Alas, historically, there has not been one clearly established method for reduction, and a variety of manipulative interventions are used in practice. (*Acad Emerg Med* 1999;6[7]:715.) The most common one is the "traditional" approach, which we were taught and I suspect you were too. It's the supination-flexion (SF) maneuver involving outward rotation of the forearm followed by elbow flexion. (*Pediatr Rev* 2008;29[7]:e42.)

An old technique, described by Hutchinson in 1885, is enjoying a recent renaissance, and it may actually be superior. (*Ann Surg* 1885;2[8]:91.) The hyperpronation (HP) approach utilizes an inward rotation, with the patient's thumb pointing down, sometimes followed by elbow flexion. Some studies have shown that this may be the superior maneuver, but definitive evidence is lacking. *Or maybe it isn't.*

The New Evidence

Hot off the presses, Bexkens, et al., undertook a systematic review comparing the traditional SF ap-

proach to the HP approach across two primary outcomes: failure rate at first reduction attempt and pain during or after reduction and recurrence rate. (*Am J Emerg Med* 2017;35[1]:159.) They included seven randomized/quasi-randomized trials published between 1998 and 2016, which included 701 patients with 351 using the SF technique and 350 with the HP technique.

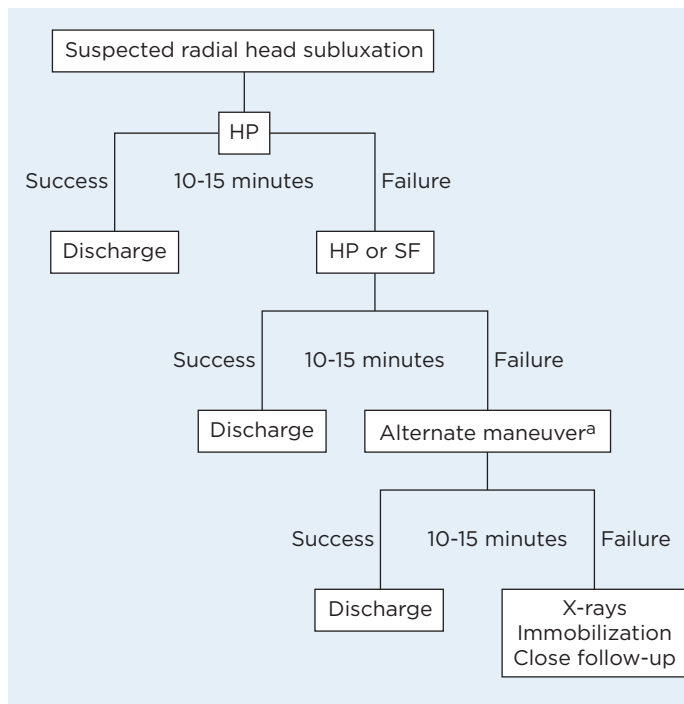
The authors pooled the data across the seven studies and ran a fixed effect model to calculate risk ratios for the primary outcome (first pass success rate). They found that the HP method was significantly more effective — 90.8 percent versus 72.6 percent — an absolute reduction of 18.2 percent, equating to an NNT of 5.5. The adjusted risk ratio was 0.34, 95% CI, 0.23 to 0.49.

Two of the studies did not address pain scores (the secondary outcome), and significant heterogeneity was seen across the other five studies, so the authors did not pool the data for analysis. Descriptively they noted that two studies reported lower pain scores in the HP group and three showed no difference. This meta-analysis also included a methodological review of the seven trials, and concluded that the data universally lacked blinding and standardized pain measures. "The quality of evidence was low in all of the studies due to the impossibility of blinding subjects, providers, and assessors after allocation of treatment intervention," the authors wrote.

This is a promising publication that could spur practice change, but it's far from definitive.

The Trial

Circumstance usually dictates our opportunities to test practice-changing evidence in day-to-day work. One of us (Dr. Ballard) has been fortunate enough to work with a very early adopter of HP, Robert Stein, DO. Dr. Stein



Start with the affected elbow positioned between 70-90 degrees of flexion, then perform HP as the initial maneuver of choice. Attempt reduction up to three times, with 10-15 minutes separating each attempt. Employ HP or SF for the second maneuver, followed by the alternate for the third attempt. Obtain elbow x-rays of children who fail to regain normal elbow function after three reduction attempts. If the films are negative, immobilize the arm and arrange outpatient follow-up with orthopedics or primary care. Note: If SF was performed for the second maneuver, undertake HP for the third; and vice versa. Source: Used with permission. *Am J Emerg Med* 2017 Mar 2; doi: 10.1016/j.ajem.2017.03.003.

stumbled upon the HP method before many other EPs after asking his attending how he preferred to reduce a nursemaid's elbow. His teacher quickly pantomimed his method in mid-air, and Dr. Stein followed his example. He returned 10 minutes later, and found the maneuver had worked.

Dr. Stein has been hooked ever since, adding a small modification with pressure against the radial head. "With the elbow in about 90 degrees of flexion, I cradle the

patient's elbow with my non-dominant palm, apply a varus stress to the radial head [using thumb or fingers to push the radial head toward the midline], and give a quick and firm hyperpronation of the distal forearm/wrist that I am holding with my dominant hand," he said.

Dr. Stein has had one or two failures over several decades, probably from the technique modification (supination vs. pronation). Dr. Ballard adopted this, and it is undefeated in first-attempt success (n=>10). One important tip from Dr. Stein: "After the reduction, I always run out. Running out is most important. I then come back in 10 minutes, or when I hear laughter coming out of the room."

The Verdict

Do you use the SF approach as front-line? Does it occasionally let you down? Maybe it's worth switching direction to hyperpronation. Bexkens, et al., agreed, concluding that "the hyperpronation technique is more effective than the supination-flexion maneuver to manually reduce nursemaid's elbow in young children."

Dr. Vinson has crafted just such an algorithm. (See figure.) **EMN**



Dr. Vinson is an emergency physician at Kaiser Permanente Sacramento Medical Center, a chair of the CREST (Clinical Research on Emergency Services and Treatment) Network, and an adjunct investigator at the Kaiser Permanente Division of Research. He also hosts *Lit Bits*, a blog that follows the medical literature at <http://drvinsonlitbits.blogspot.com>.



Dr. Ballard is an emergency physician at San Rafael Kaiser, a chair of the KP CREST (Clinical Research on Emergency Services and Treatments) Network, and the medical director for Marin County Emergency Medical Services. He is also the creator of the *Medically Clear* podcast on iTunes or at <https://medium.com/medically-clear>. Follow him on Twitter @dballard30. Read his past articles at <http://bit.ly/EMN-MedClear>.