UMMC Research Reveals Overwhelmingly Incorrect Splinting for Kids' Fractures

With up to half of all children's visits to emergency rooms and urgent care centers stemming from the same problem — bone fractures — it stands to reason that splinting bones in preparation for further treatment would be a textbook process with reliably effective results.

JOSHUA M. ABZUG, M.D., leading new research on pediatric bone splinting.

But startling new research from University of Maryland indicates this presumption is patently false. In fact, the study — publicized in *The New York Times* and other major media outlets — shows that stabilizing children's broken bones is done incorrectly more than 9 times out of 10, mistakes that can lead to complications such as pain, swollen limbs, skin ulcers or worse.

"We'd noticed a problem that splints are often not optimal," explains lead investigator Joshua M. Abzug, M.D., director of pediatric orthopaedics at University of Maryland Medical Center (UMMC) and an assistant professor of orthopaedics at University of Maryland School of Medicine. Dr. Abzug presented the study at the October 2014 American Academy of Pediatrics (AAP) meeting in San Diego.

"The ultimate solution is to provide education to healthcare and pediatric care providers, but we needed to see how bad the problem was," he adds. "This was sort of a stepping stone to figure that out."

Crucial Window for Bone Stabilization

Fractures are the fourth most common injury in children under age 6, according to the AAP, and nearly half of all boys and a quarter of all girls will break an arm or leg before age 16. When these kids come to an ER or urgent care center for treatment, however, they usually don't see an orthopaedist. Instead, their injury is commonly splinted by a practitioner ranging from an emergency physician to a medical resident, physician assistant, nurse, nurse-practitioner or cast technician — all of whom may have received variable training on how to properly immobilize and stabilize a broken bone.

Dr. Abzug, whose numerous research studies have been widely published in medical journals, contends that proper splinting of these injuries is crucial for several reasons. Top among them is that splinting is usually the first treatment for fractures and may precede a visit to an orthopaedist for casting or surgery by several days or longer.

"When a patient comes to the doctor within a day or two of splinting, splints don't need to be optimal," he says. "But often, patients don't show up to a doctor within a day or two — sometimes it's several weeks because of problems with insurance or the parents having trouble taking time off work."

In that lengthy period, a bone splinted incorrectly may have already started to heal incorrectly, as well as triggering

KEY POINTS:

- UMMC research team uncovers incorrect splinting in 93% of children's fractures
- Dr. Joshua Abzug's study presented at American Academy of Pediatrics conference
- Pain, swelling, skin ulcers and other complications resulted from poor splinting
- Lack of medical continuity and training may be to blame
- Dr. Abzug continuing research, outreach efforts to help educate practitioners on widespread basis

other complications. A broken ankle that's not set at a 90-degree angle — the same angle as needed for walking — can lead to future range-of-motion problems, for example.

"So a splint is meant to be temporary care," he says, "and if it's suboptimal, patients aren't getting the best treatment."

FINDINGS 'KIND OF SCARY'

In his new study, Dr. Abzug and his research team evaluated 225 children averaging 8 years old who came to UMMC's pediatric orthopaedic clinic wearing splints placed at other institutions. The researchers gathered information about the patient, type of splint, practitioner who placed the splint and amount of time that elapsed from splint application to orthopaedic evaluation.

The child's splint was then evaluated by the team for functional position, appropriate length and the presence of any elastic bandage directly on the skin. After front and side photographs were taken, the splint was removed and the child's arm or leg examined for any soft tissue complications resulting from the splint placement.

The results were jarring: Not only had 93% of splints been improperly placed, but they were either too short or too long in half the cases. Additionally, the stretchy Ace-type bandage used in splinting had been placed directly on the skin (instead of on a protective cotton cloth) about 77% of the time. In about one-quarter of cases, the elastic bandage had been wound too tightly or ended in the wrong place, interfering with circulation.

Because of these improper techniques, skin and soft tissue complications such as pressure points, ulcerations and swelling were observed in 40% of patients, and 12% exhibited two or more complications. None of the mistakes resulted in major complications requiring surgery, but such an outcome is possible — posing not only medical but legal ramifications, he says.

"I thought we'd find a high percentage of splints placed inappropriately, but not anywhere near what we found," says Dr. Abzug, who came to UMMC after completing an upper extremity/pediatric orthopaedics fellowship at Shriners Hospital for Children and St. Christopher's Hospital for Children, both in Philadelphia. "It's kind of scary, when you think about how often splints are applied."

EFFECTING WIDESPREAD IMPROVEMENT

Why are mistakes so commonplace in splinting kids' fractures? A lack of continuity and proper training may be to blame, Dr. Abzug says.

In past decades, broken bones typically would be diagnosed and treated by the same person in the ER. But now, because of increasing medical specialization and the proliferation of urgent care centers, it's more common for the healthcare professional who splints the fracture to instruct parents to follow up with an orthopaedist afterward.

Also, healthcare providers aren't necessarily trained in a standardized manner on how to stabilize fractures, he says.

Having established how commonplace sloppy splinting seems to be in medical practice, Dr. Abzug isn't stopping there. With a track record of teaching medical students, residents and fellows — as well as numerous physicians at the local, regional and national levels — his ongoing research on the topic includes a before-and-after assessment of splinting techniques in practitioners after completion of a specific training program.

He is also developing posters about correct splint placement that he hopes will be widely distributed in ERs and urgent care centers.

"I'd like to see if education can make a difference, if we can effect a change in those applying the splints," he says. "If it works at one place, maybe it can work ... in the whole country." ✚

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