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5-2022

### Toddler Tibia Fracture

Children's Mercy Kansas City

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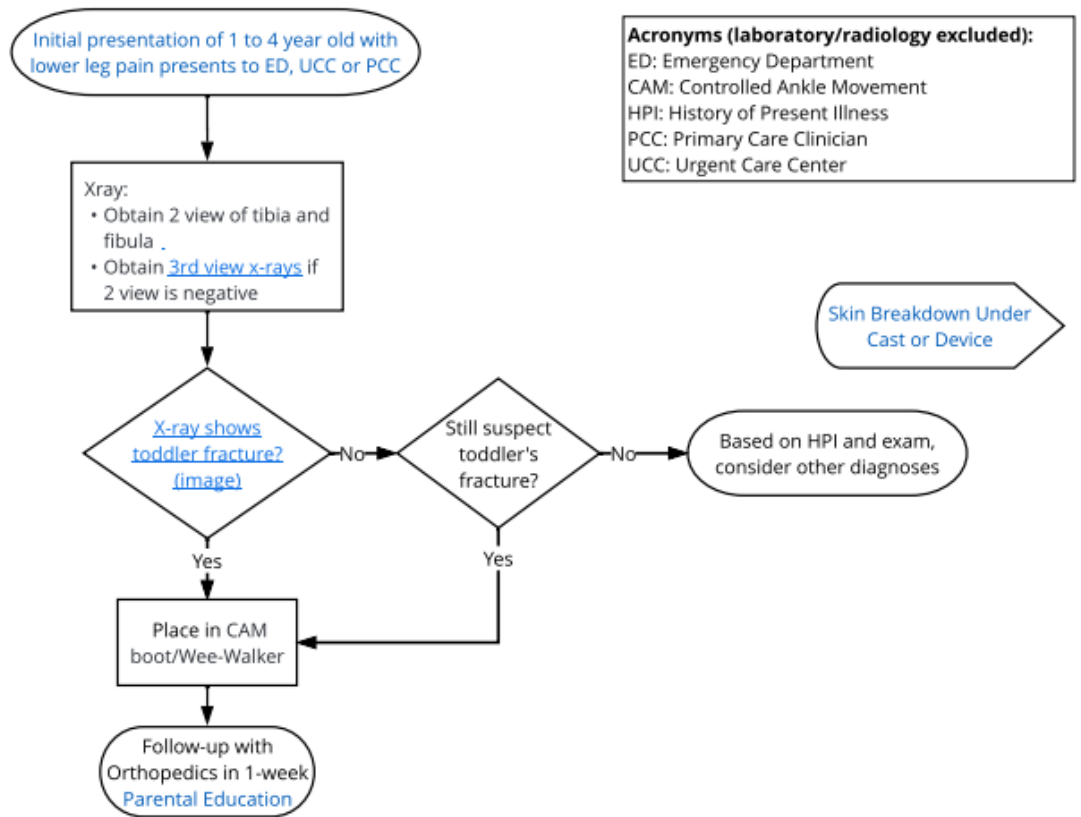
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**Children's Mercy Hospitals and Clinics  
Evidence Based Practice Care Process Model**

**Toddler Tibia Fracture Care Process Model**



**Toddler Tibia Fracture  
ED, UCC, PCC**



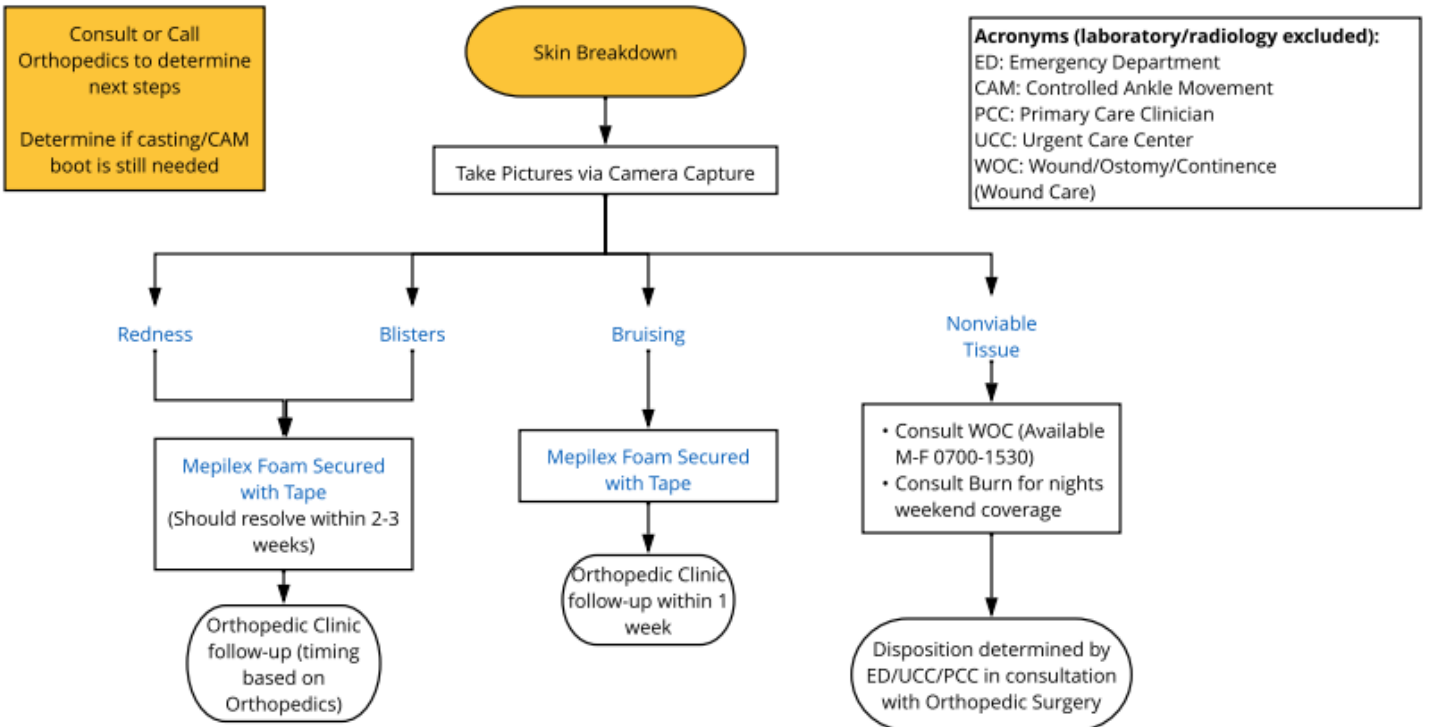
Contact: [EvidenceBasedPractice@cmh.edu](mailto:EvidenceBasedPractice@cmh.edu)

Last Updated: 5.16.22

For additional information, [link to synopsis](#)

*This care process model/clinical practice guideline is meant as a guide for the healthcare provider, does not establish a standard of care, and is not a substitute for medical judgment which should be applied based upon the individual circumstances and clinical condition of the patient.*

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**Objective of Care Process Model:**

- Standardize the care of toddler tibia fractures using Controlled Ankle Motion (CAM) boots and reduce the number of heel ulcers

**Target Users:**

- Emergency Department Clinicians
- Urgent Care Clinicians
- Orthopedic Clinic Clinicians
- Pediatricians

**Guideline Inclusion Criteria:**

- Patients aged 1 to 4 years
- Stable tibial shaft or distal tibia fracture, defined as:
  - no cortical displacement
  - no fracture shortening
  - no angulation
  - no malrotation
  - intact fibula
  - Can be spiral or buckle fracture pattern

**Guideline Exclusion Criteria:**

- Patients with multisystem trauma
- High energy mechanism
- Infection
- Neoplasm
- Non-accidental trauma
- Non-ambulatory
- Multiple fractures
- Metabolic bone disease
- Any amount of cortical displacement
- Any amount of fracture shortening
- Any amount of angulation
- Reduction required
- Associated fibula fracture

**Outcome Measures:**

- Complications of care
- Percent Usage of the CAM boot

**Process Measures:**

- Number of heel ulcers
- Prolonged limping
- Patient family satisfaction

**Balance Measures:**

- Change of treatment
- Fracture displacements

**Potential Cost Implications:**

- Decreasing cost of care through decreased clinic visit and decreased x-rays

**Potential Organizational Barriers:**

- Availability of CAM boots
- Clinic access (wound care)

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- Delay in presentation from outside facility

**Race/Ethnicity:**

- Data to be collected in IRB proposal

**Supporting Tools:**

- Patient education material (Appendix A)

**Practice Recommendations:****Toddler Tibia Fracture****Assessment:****Clinical History:**

- Patient aged 1 to 4 years of age
- Low-energy mechanism of injury (ground level fall, twisting injury, going down a slide)
- Refusal to bear weight
- Minimal pain at rest
- No concern for infection or malignancy (fevers, chills, weight loss, loss of appetite, ill appearance, insidious onset)

**Physical Examination:**

- Inspection, look for swelling, bruising, obvious deformity, open wounds/fracture
- Palpate the tibia,
  - Often will have point tenderness even without significant swelling/bruising
- Palpate the foot and femur
  - These should be non-painful
- Assess range of motion of hip, knee, and ankle
  - These should be normal without pain
- Assess for joint effusion of knee and ankle
  - These should be normal without swelling
- Assess neurovascular status
  - Capillary refill
  - Palpate dorsalis pedis and posterior tibial pulse
  - Neurologic exam is often difficult secondary to young age and is primarily performed via inspection of spontaneous movement throughout history and exam
  - Assess deep peroneal nerve:
    - Ankle dorsiflexion and toe extension
    - Sensation of 1<sup>st</sup> web space
  - Assess the superficial peroneal nerve:
    - Ankle eversion
    - Sensation of dorsal aspect of foot
  - Assess the tibial nerve:
    - Ankle plantarflexion, ankle inversion, and toe flexion
    - Sensation of plantar aspect of foot
  - Assess the saphenous and sural nerves
    - Only sensation at the level of the foot and difficult to assess
    - Saphenous sensation about medial malleolus
    - Sural sensation on lateral aspect of foot

**Radiographs:**

- Patient's that cannot bear weight should have x-rays of the involved lower extremity
- This should be guided by clinical exam
  - If palpation of the tibia elucidates pain, tibia films should be ordered
- AP and lateral x-rays of the tibia/fibula should be obtained

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- If initial 2 views are negative but clinical suspicion is high, an additional internal oblique view should be obtained.
- If clinic suspicion remains high despite negative x-rays, all 3 views, and no other diagnosis, proceed with treatment as a "suspected" toddler's fracture
- If clinical history and exam are concerning for additional pathology, such as infection as indicated by fevers or limited joint movement, then joint ultrasounds, additional lower extremity x-rays, and infection labs should be drawn as indicated. Further workup is not included in this synopsis.

**Treatment:**

- Place in a removable CAM boot
  - Do not place in cast or temporary hard splint
  - If boot is unavailable or no correct sizes are available, patient may be placed in "bulky" soft splint with cast padding and ace wrap
- Patient can be weight bearing as tolerated in CAM boot
- OK to remove daily for bathing
- Remove at least one other time per day to monitor skin
- Once weight bearing has begun in boot, can begin to wean out of boot as tolerated.
- OK to sleep in boot, but not required
- If patient will not wear boot, this is ok and does not need to be forced. Leg can be wrapped with an ace wrap and padding or left without any immobilization
  - Toddler's fractures are stable injuries and patients will self-regulate

**Need for Orthopedic referral:**

- 1 week follow up in Orthopaedic Surgery Fracture clinic if placed in boot at CMH facility
  - 24-48 hours if being referred from outside facility.
  - Skin and clinical check only – no x-rays needed
  - Can be telehealth if patient already has boot
- Second follow up visit
  - 4 weeks from injury
  - Clinical & check and tibia/fibula X-ray
  - Families educated that patient may continue to limp for up to 1 month after last clinic visit
  - PRN follow up

**Pain management:**

- Initial pain can be managed with ibuprofen and acetaminophen as needed, narcotic pain medication is not indicated
- Patients will self-regulate and begin weight-bearing when pain has improved

**Care Process Preparation:** This care process was prepared by The Department of Evidence Based Practice (EBP) in collaboration with content experts at Children's Mercy Kansas City. The development of this care process supports the Department of Clinical Effectiveness's initiative to promote care standardization that builds a culture of quality and safety that is evidenced by measured outcomes. If a conflict of interest is identified the conflict will be disclosed next to the committee member's name.

**Toddler Fracture Committee Members:**

- Micah Sinclair, MD | Orthopedic Surgery | Committee Leader
- Caleb Grote, MD, PhD | Orthopedic Surgery | Committee Member
- Prema D Souza, MD | Urgent Care | Committee Member
- Lina Patel, MD | Emergency Department | Committee Member
- Anik Patel, MD, FAAP | Emergency Department | Committee Member
- Evan Weber, MD | General Academic Pediatrics | Committee Member
- Brian Haney, BSN, RN, CWCN, WTA-C | Wound Care | Committee Member

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**Office of EBP Committee Members:**

- Todd Glenski, MD, MSHA, FASA | Department of Evidence Based Practice | EBP Medical Director
- Jarrod Dusin, MS, RD, LD, CPHQ | Department of Evidence Based Practice | EBP Program Manager

**Care Process Model development funded by:** The development of this guideline was underwritten by the EBP and Orthopedic Surgery, Urgent Care, Emergency Department, and General Academic Pediatrics.

**Approval Process:** Care processes are reviewed and approved by the Content Expert Committee, the Office of EBP, and other appropriate hospital committees as deemed suitable for the guidelines’ intended use. Care processes are reviewed and updated as necessary every three years within the Office of EBP at CMH&C. Content expert Committees will be involved with every review and update.

Department/Unit	Date Approved
Orthopedic Surgery	May 2022
ED	May 2022
UCC	May 2022
General Academic Pediatrics	May 2022

**Version History:**

Date	Comments
May 2022	First Version

**Date for Next Review:** May 2023

**Disclaimer:**

When evidence is lacking or inconclusive, options in care are provided in the guideline and the power plans that accompany the guideline.

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## References

- Bradman, K., Stannage, K., O'Brien, S., Green, S., Bear, N., & Borland, M. (2021). Randomised controlled trial comparing immobilisation in above-knee plaster of Paris to controlled ankle motion boots in undisplaced paediatric spiral tibial fractures. *Emergency Medicine Journal*, 38(8), 600-606.
- Bauer, J. M., & Lovejoy, S. A. (2019). Toddler's fractures: time to weight-bear with regard to immobilization type and radiographic monitoring. *Journal of Pediatric Orthopaedics*, 39(6), 314-317.
- Schuh, A. M., Whitlock, K. B., & Klein, E. J. (2016). Management of toddler's fractures in the pediatric emergency department. *Pediatric emergency care*, 32(7), 452.

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Appendix A

**TODDLER'S FRACTURE**



**TODDLER'S FRACTURE**

- What is a Toddler's Fracture?
  - » An injury to the big bone below the knee, sometimes called the shin bone (tibia).
  - » The bone is broken, but it is held tightly together by the outer covering of the bone (periosteum).
  - » This happens in children ages 1-4 years old.
- How do you know it's a Toddler's Fracture?
  - » The child injured themselves from a fall, tripping, twisting or going down a slide.
  - » When the leg is pushed on over the shin bone it causes pain.
  - » Sometimes the child will limp or won't want to walk.
  - » X-rays are taken which show a broken bone near the ankle (see picture below).
  - » If the X-ray doesn't show a broken bone, it might still be broken. This is called a "suspected toddler's fracture."



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**HOW DO YOU CARE FOR YOUR CHILD WITH A "TODDLER'S FRACTURE"?**

- To make an appointment in the Orthopedic Surgery Clinic
  - » Please call (816) 234-3075, or
  - » Visit our website at: <https://www.childrensmercy.org/your-visit/before-you-arrive/scheduling-an-appointment/>
- Your child should be evaluated in the Orthopedic Surgery clinic within 1 week of their injury.
  - » They do not need an X-ray at that visit.
- You will protect your child's leg by having them wear a special boot, called a "CAM" boot.
  - » (CAM = Controlled Ankle Motion)
- The boot must be removed to look at the skin at least 1 time per day.
  - » Check the skin every day at bedtime or bath time.
  - » Look for redness, blisters, bruising or openings of the skin.
  - » If you see any of these on your child's skin:
    - Please call the Orthopedic Surgery Clinic at (816) 234-3075 or send a picture through the Patient Portal.
    - This can be caused by the boot being too loose or too tight.
    - Stop wearing the boot until the you hear from your care team.
    - A visit to the clinic will be needed to check how the boot is fitting and look at the skin.
- Your child does not have to sleep in the boot.

**HOW DO I KNOW THE BOOT IS ON RIGHT?**

1. Place the heel firmly down the back of the CAM Boot.
2. Place padding over the foot and shin.
3. Ensure the toes are within the firm sole of the boot.
4. Fasten the Velcro straps so the boot doesn't move around on the foot.

**HOW LONG DOES IT TAKE FOR THE BROKEN BONE TO HEAL?**

- After your child has started to walk in the boot, they can start to wear it less.
- This usually happens between 2-4 weeks after the injury.
- Your child will have a second appointment in the Orthopedic Surgery Clinic 4 weeks after the injury.
  - » Their leg will be examined.
  - » They will have new X-rays taken.
  - » If they are still using the boot for walking, they won't need to wear it anymore after this doctor's appointment.
  - » Most of the time, they won't need to come back for any more appointments.

**WILL MY CHILD HAVE PROBLEMS WITH THEIR LEG AFTER A TODDLER'S FRACTURE?**

- Most of the time, this fracture has no long-term problems after it is healed.
- Your child might limp or walk differently for up to 1 month after they stop wearing the boot (up to 2 months after injury).

**PLEASE CALL THE ORTHOPEDIC SURGERY CLINIC AT (816) 234-3075 FOR AN APPOINTMENT 2 MONTHS AFTER THE INJURY IF:**

- Your child is still having pain, OR
- Your child is still walking with a limp.
- For more information, please visit: [orthokids.org/en-US/I-Broke-My-Tibial-Shaft-Fractures](http://orthokids.org/en-US/I-Broke-My-Tibial-Shaft-Fractures)



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