

**Pediatric Traumatic Hip Dislocation**

*Data Entry Guide*

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**Objectives:**

**Primary:**

* To determine the rate and risk factors for AVN and the functional outcomes following post- dislocation AVN of the femoral head
* To establish differences in reduction protocols/ incidence of femoral head fractures and other adverse events of reduction (OSH vs CORTICES hosp, and ED vs OR)
* To establish post-reduction imaging protocols (MRI findings vs CT, what findings were present and addressed on MRI that would not have been found on CT)
* To develop a classification system for traumatic pediatric hip dislocations

**Secondary:**

* To establish post-reduction rehabilitation protocols (bracing duration, immobilization strategy by age)
* To determine the risk factors for hip instability/re-dislocation/stiffness

**Tertiary:**

* To determine factors influencing return to sports

**Data Entry Guide**

When entering your patient data, you will be asked to enter a new or existing Record ID. Please use your 2-digit Unique Site Number (shown below) for your site’s data.

|  |  |  |  |
| --- | --- | --- | --- |
| **Site #** | **Site** | **Site #** | **Site** |
| 20 | Boston Children’s | 30 | Le Bonheur Children’s |
| 21 | Carolinas Medical Center | 31 | Lurie Children’s |
| 22 | Children’s Atlanta | 32 | Nationwide Children’s |
| 23 | Children’s Colorado | 33 | Rady Children’s |
| 24 | Children’s Dallas | 34 | Seattle Children’s |
| 25 | Children’s LA USC | 35 | St. Louis Children’s |
| 26 | Children’s Philadelphia | 36 | Texas Children’s |
| 27 | Cincinnati Children’s | 37 | Vanderbilt Children’s |
| 28 | CS Mott Children’s (Michigan) | 38 | UCSF |
| 29 | Gillette Children’s  |  |  |

To generate your REDCap Record IDs, please use the following format (below), where ‘S’ is the 2-digit site code and ‘P’ is the 3-digit record ID. The IDs should be sequentially recorded.

|  |
| --- |
| **S S – P P P**  |
|  |
| 2-digit Unique **Site** Number  | ­­ |
| 3-digit Sequential **Patient** ID Number |  |

For example, BCH’s first patient would have a REDCap ID of “20-001”. BCH’s twentieth patient would have a REDCap ID of ’20-020’. It is crucial that sites use the correct site ID to avoid duplicate REDCap IDs.

**\*Note:** If you were a site involved with beta testing this REDCap and inputted training data, please review all fields for your test patients as the REDCap could have changed after beta testing. You may keep the same Record ID for the test patient, but the data must be re-validated.

**Form Completion Technique**

All data is to be entered directly into REDCap from the medical records. There are seven REDCap forms.

When entering data, please follow the rules below:

1. Mark REDCap page status for each form as appropriate:
	1. **Incomplete (RED):** Data not fully entered yet.
	2. **Complete (GREEN):** All data points are fully entered including missing codes.
2. Use correct missing codes (no fields/questions should be left blank)
	1. Next to the question you will see a **M** in a circle: Please choose the proper missing code



**Design and Patient Search:**

* Retrospective Review
* Date range: 1/1/2011 to 1/1/2024 with hip dislocation or hip fracture-dislocation.
* Hip Dislocation Codes (please enter these codes to identify patients):
	+ ICD – 9: 835.00, 835.01, 835.02, 835.03, 835.10, 835.11, 835.12, 835.13
	+ ICD – 10: S73.004, S73.005, S73.006, S73.014, S73.015, S73.016, S73.024, S73.025, S73.026, S73.034, S73.035, S73.036, S73.044, S73.045, S73.046.
	+ CPT:
		- 27253 Open treatment of hip dislocation, traumatic, without internal fixation
		- 27254 Open treatment of hip dislocation, traumatic, with acetabular wall and femoral head fracture, with or without internal or external fixation
		- 27250 Closed treatment of hip dislocation, traumatic; without anesthesia
		- 27252 Closed treatment of hip dislocation, traumatic; requiring anesthesia

**Eligibility:**

* **Inclusion (All Studies):**
	+ Presented with injuries between 1/1/2011 and 1/1/2024
	+ Age 0 to 18 years at date of injury
	+ Diagnosis of hip dislocation or fracture-dislocation (fractures of the proximal femur or acetabulum or pelvis)
	+ Follow up – Minimum 3 months
* **Exclusion:**
	+ Previous history of fracture without dislocation.
	+ Underlying other diagnosis or non-trauma related dislocation (e.g. congenital dislocation or developmental dysplasia of the hip)
	+ Inadequate documentation or x-rays.

# **Form for Eligibility:**

* Patients 0 to 18.99 years old at time of initial hip dislocation
	+ Yes (Include)
	+ No (Exclude)
* Previous history of fracture
	+ Yes (Exclude)
	+ No (Include)
* Underlying other diagnosis or non-trauma related dislocation e.g. congenital dislocation or developmental dysplasia of the hip
	+ Yes (Exclude)
	+ No (Include)
* Has Injury radiographs
	+ Yes (Include)
	+ No (Exclude)
* Inadequate documentation
	+ Yes (Include)
	+ No (Exclude)
* Follow up
	+ None (Include for classification study or an epidemiological investigation)
	+ 3 months (Include for outcome studies)

# **Form – 1: Demographics:**

1. Patient ID
2. Date of Birth
3. Sex
4. Race
5. Ethnicity
6. Height (at injury)
7. Weight (at injury)
8. BMI (at injury)
9. Athlete (Patients who participates regularly in sports program activities)
	1. Yes
	2. No
	3. Not specified
10. What sport does the patient primarily participate in? Baseball
	1. Basketball
	2. Cycling
	3. Competitive wrestling
	4. Competitive running (Cross country, track and
	5. field, etc.)
	6. Dance
	7. Field Hockey
	8. Football
	9. Figure Skating
	10. Gymnastics
	11. Hockey
	12. Lacrosse
	13. Martial Arts
	14. Racquet (tennis, racquetball, squash, badminton,
	15. etc.)
	16. Rugby
	17. Skiing
	18. Snowboarding
	19. Soccer
	20. Swimming
	21. Volleyball
	22. Water Polo
	23. Other

# **Form – 2: Presentation, Injury and Clinical Features:**

**Presentation and Injury:**

1. Date of injury
2. Time of injury
3. Date of Presentation
4. Time of Presentation
5. Age at injury
6. Mechanism of Injury
	1. Sports
	2. Low Energy Trauma (Slip, Trip, Skid while standing/walking/running)
	3. High Energy Trauma (Down the stairs, Monkey bars, Trampoline, body-powered (cycling, skating, snowboarding, manual scooter))
	4. MVA: Motor-powered (Motorized hoverboard/scooters/bike, ATV, 4 wheelers, car accident)
	5. Other
7. Location of Presentation:
8. Urgent care
9. Clinic
10. Emergency Room – CORTICES Center
11. Emergency Room – Outside Hospital
12. Other: \_\_\_\_\_\_\_\_
13. Who performed the reduction?
14. Resident
15. Fellow
16. Attending
17. APP/NP
18. Where was the reduction performed?
19. Emergency room
20. Operating room
21. What type of anesthesia was used for reduction?
22. Sedation
23. General anesthesia/Laryngeal mask airways (LMA) etc.
24. Date and time of discharge
25. Date of Last follow-up

**Clinical Features:**

1. Is the Dislocation acute or chronic at presentation:
	1. Acute (<3 weeks)
	2. Chronic (>3 weeks)
2. Is the Dislocation unilateral or bilateral:
	1. Unilateral
		1. Left
		2. Right
	2. Bilateral (if bilateral, create 2 separate records, one for each side)
		1. Left
		2. Right
3. Is there a Neurovascular Injury:
	1. Nerve (Please look for the term “nerve injury” or symptoms of neurological deficit - paresthesias, tingling, numbness, weakness of a muscle group, may also be termed as “footdrop”):
		1. Sciatic
			1. Common Peroneal
			2. Tibial
			3. Both
		2. Gluteal
		3. Other: \_\_\_\_\_\_\_\_\_
	2. Vascular (Please look for the term “vascular injury” or “arterial injury” or “pulselessness” or “absent pulses”):
		1. Femoral
		2. Other
	3. None
	4. Not recorded
4. Is this a poly-trauma patient:
	1. Yes
	2. No
5. If poly-trauma, was the patient hemodynamically stable at presentation (Please look for the term “hemodynamically stable” or “hemodynamically unstable” or “hypotension” or “hypotensive” or “shock” or “hemodynamic shock” at presentation):
	1. Yes
	2. No
6. Are there any other injuries?
	1. Abdomen/Pelvic
	2. Limbs
	3. Spine
	4. No

# **Form – 3a: Management – Imaging (Pre- and Post-Reduction):**

**Hip Imaging (Pre-reduction):**

1. Date of x-ray
2. Direction of Dislocation on Pre-reduction x-rays:
3. Anterior
4. Posterior: Thompson and Epstein (Appendix II) (If unsure confirm with PI)
	1. Types I to V
5. Central
6. Is there an associated injury on pre-reduction x-rays?
7. Femoral head fracture
8. Femoral neck fracture
9. Acetabulum fracture
10. Physeal injury
11. Other: \_\_\_\_\_\_\_\_\_\_\_
12. None
13. Proximal Femur Maturity Index (PFMI) (If unsure confirm with PI)
	1. Grade 0 – 6.
14. Skeletal Maturity (x-ray of contralateral Hip) (Appendix I) (If unsure confirm with PI)
	1. Femoral head
		1. Open
		2. Closed
		3. Closing
	2. Tri-Radiate Cartilage
		1. Open
		2. Closed
		3. Closing
	3. Risser Stage
		1. stage 0: no ossification center at the level of iliac crest apophysis
		2. stage 1: apophysis under 25% of the iliac crest
		3. stage 2: apophysis over 25-50% of the iliac crest
		4. stage 3: apophysis over 50-75% of the iliac crest
		5. stage 4: apophysis over >75% of the iliac crest
		6. stage 5: complete ossification and fusion of the iliac crest apophysis
15. Pre-reduction Advanced Imaging:
	1. CT Scan
	2. MRI
	3. None
16. Is there an associated fracture on pre-reduction advance imaging (Did the imaging reveal any new findings)?
	1. Femoral head
	2. Femoral neck
	3. Acetabulum
	4. Other: \_\_\_\_\_\_\_\_\_\_\_
	5. None

**Hip Imaging (Post-reduction):**

1. Date of x-ray
2. Do the Post-Reduction x-rays show any new injury?
	1. Yes
		1. Specify
	2. No
3. Were there any reduction related injury?
	1. Yes
		1. Specify
	2. No
4. Does the patient have post-reduction advance imaging (Did the imaging reveal any new findings)?
	1. CT
		1. Acetabular fracture
		2. Femoral Head fracture
		3. Femoral Neck fracture
		4. Other: \_\_\_\_
	2. MRI
		1. Femoral head fracture
		2. Femoral neck fracture
		3. Acetabulum fracture
		4. Labral Injury
		5. Osteochondral injury
		6. Capsular tear
		7. Ligamentous injury
		8. Muscular tear
	3. None
5. Classification of Femoral neck fracture (Appendix III): (If unsure confirm with PI)
	1. Delbert Type 1 (Transphyseal)
	2. Delbert Type 2 (Transcervical)
	3. Delbert Type 3 (Cervicotrochanteric/basicervical)
	4. Delbert Type 4 (Intertrochanteric)
6. Classification of Acetabular Fractures (Watt’s) (If unsure confirm with PI)
	1. A - Small fragments associated with dislocation of the hip joint
	2. B - Undisplaced linear fractures associated with pelvic fractures
	3. C - Linear fractures with hip joint instability
	4. D - Central fracture dislocation of the hip
7. Are there associated limb injuries or other injuries?
	1. Ipsilateral limb
		1. Femur Shaft/distal
		2. Patella
		3. Tibial proximal/shaft/distal
		4. Fibula proximal/shaft/distal
		5. Ankle/Foot
	2. Contralateral limb
		1. Femur Shaft/distal
		2. Patella
		3. Tibial proximal/shaft/distal
		4. Fibula proximal/shaft/distal
		5. Ankle/Foot
	3. Spine
	4. Pelvic Ring
8. Measures of Hip Dysplasia/Impingement (To be measured in the contralateral side) (Appendix IV): (To be filled by the PI)
	1. Lateral Center-edge angle
	2. Acetabular index (if open triradiates)
	3. Posterior Wall Index
	4. Proximal PASA
	5. Intermediate PASA
	6. Equatorial PASA

# **Form – 3b: Management – Reduction:**

1. Date and Time of reduction:
2. Was the reduction performed using fluoroscopic assistance?
	1. Yes
	2. No
3. Time to reduction (Calculated field)
4. Number attempts to closed reduction: \_\_\_
5. What the primary reduction closed, open or spontaneous?
	1. Spontaneous
	2. Closed
	3. Open
6. Was there a failed closed reduction?
	1. Yes
	2. No
7. Open reduction approach:
	1. Anterior
	2. Posterior
	3. Lateral
8. Was there any complication post reduction?
	1. Nerve (Please look for the term “nerve injury” or symptoms of neurological deficit - paresthesias, tingling, numbness, weakness of a muscle group, may also be termed as “footdrop”):
		1. Sciatic
			1. Common Peroneal
			2. Tibial
			3. Both
		2. Gluteal
		3. Other: \_\_\_\_\_\_\_\_\_
	2. Vascular (Please look for the term “vascular injury” or “arterial injury” or “pulselessness” or “absent pulses”):
		1. Femoral
		2. Other
	3. None
	4. Fracture
	5. Other:\_\_\_\_\_\_
9. Was there instability following reduction?
	1. Yes
	2. No
10. Did the patient have full ROM follow reduction?
	1. Yes
	2. No (enter -999 if not available)
		1. Loss in flexion (deg)
		2. Loss in extension (deg)
		3. Loss in adduction (deg)
		4. Loss in abduction (deg)
11. Did the patient undergo surgery following reduction (same day/next day/second staged procedure)?
	1. Yes
		1. Procedure: Arthroscopy, Open Procedure, Arthroscopy followed by open procedure
		2. Loose body, Labral repair etc., osteochondral fixation, ORIF, arthrogram, other
	2. No

# **Form – 3c: Management – Post-Reduction:**

1. Was the patient kept overnight in the ED?
	1. Yes
	2. No
2. Was the patient admitted from the ED?
	1. Yes
	2. No
3. What immobilization was recommended/given post-reduction?
	1. Hip spica
	2. Bed rest/No immobilization
	3. Skeletal Traction
	4. Skin/Buck’s traction
	5. Brace
4. What was the recommended length of immobilization following reduction? \_\_\_\_\_\_ weeks (enter -999 if not available)
5. What was the bearing restriction following reduction?
	1. No walking
	2. Non-weight bearing.
	3. Toe-Touch weight bearing
	4. Partial weight bearing
	5. Full weight bearing

# **Form – 4: Follow up (Repeating forms) (First form will contain all the details with respect to date specific return to sport, weight bearing etc.)**

1. Date of follow-up:
	1. Calculated field (First visit – follow-up date)
2. Which follow up is this?
	1. No follow up
	2. 0-3m
	3. 3.1-6m
	4. 6.1-12m
	5. 13-24m year
	6. 2y – 3.99 years
	7. 4+ year
3. Did the patient return to full weight bearing?
	1. Yes
		1. Date:\_\_\_\_\_\_\_\_
	2. No
4. Was the patient released for unrestricted normal activities of daily living?
	1. Yes
		1. Date:\_\_\_\_\_\_\_\_
	2. No
5. Was the patient released for sports?
	1. Yes
		1. Date:\_\_\_\_\_\_\_\_
	2. No
6. Was there special testing prior to release to sports?
	1. Yes
	2. No
7. Return to sports details
	1. Patient returned to same sport
	2. Patient returned to same level of sport Missing
8. Range of motion
	1. Full
	2. Restricted
	3. Exact ROM (Enter -999 it not available):
		1. Flexion
		2. Extension
		3. Abduction
		4. Adduction
		5. IR
		6. ER
9. Did the patient have instability (“clicking/feels unstable/hip feels like it’s going to come out”)?
	1. Yes
	2. No
10. Upadhyay and Moulton grading of dislocation at final follow-up (Please look the chart to identify the outcome mentioned below and use best judgement to classify into a particular category)
	1. **Excellent:**Hip returned to normal with a full free range of movement; there was no pain, weakness or fatigue; and the radiograph revealed no narrowing of the joint space, vascular changes or arthritis.
	2. **Good:**The patient had no appreciable pain or limp except after a long day of hard work and weight-bearing, and no more than 25 percent restriction of movement. The radiographs might show minimal arthritic changes, but no evidence of avascular necrosis or narrowing of the joint space.
	3. **Fair:**The patient had mild to moderate pain, a moderate limp and 25 to 50 degrees restriction of movement, and no adduction deformity. The capacity to work although curtailed was still adequate for maintaining a light job. Moderate arthritic changes and the formation. of osteophytes with mild to moderate narrowing of the joint spaces were demonstrated radiographically
	4. **Poor:**
	The Patient had pain, a limp, and moderate to extreme limitation of movement with or without an adduction deformity. An occupation which required walking or standing was not possible. Radiographs revealed one or more of the following: advanced arthritis; avascular necrosis of the femur; marked or pronounced narrowing of the joint space; cyst formation; or sclerosis of the acetabulum.

# **Form – 5: Complications/Return to Operating Room**

1. Did the patient have any complications?
	1. Yes
	2. No
2. Complication type
	1. AVN
	2. Residual arthritis
	3. Fracture malunion/nonunion
	4. Growth disturbance
	5. Instability
	6. Recurrent dislocation
	7. Infection
	8. Coxa magna
	9. Residual nerve injury
	10. Stiffness/Arthrofibrosis
	11. Re-Fracture
	12. Other

--------------------X--------------------

**These fields drop individually for all the above and have the same “type” of questions except for AVN.**

* AVN
1. Date of AVN
2. Time to AVN
3. AVN
	* 1. What was the stage of AVN? (Appendix V) (To be filled by the PI)
			+ 1. Type A, Type B or Type C
		2. FICAT Stage (To be filled by the PI):
			+ 1. Stage 0, 1, 2a, 2b, 3 or 4
		3. How was the AVN managed?
			+ 1. Observation
				2. Surgery
				3. Date of surgery

Core Decompression

Bone Marrow Grafting

Total Hip Replacement

Other

1. Date of Resolution
* Other Complications
1. Date
2. How was it managed
	* + - 1. Observation
				2. Surgery

Date

Procedure

1. Date of resolution

**References:**

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			9. STEWART, M. J., & MILFORD, L. W. (1954). Fracture-dislocation of the hip; an end-result study. The Journal of Bone and Joint Surgery. American Volume, 36(A:2), 315–342.
			10. THOMPSON, V. P., & EPSTEIN, H. C. (1951). Traumatic dislocation of the hip; a survey of two hundred and four cases covering a period of twenty-one years. The Journal of Bone and Joint Surgery. American Volume, 33-A(3), 746–778; passim.
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