Agility Outcome Measures and Gait Analysis in the Physical Therapy Rehabilitation of an Adolescent with an Acetabular Hip Fracture: A Case Report

Emily Lodge, BS, DPT Student, Kirsten R. Buchanan, PhD, PT, ATC
Department of Physical Therapy, University of New England, Portland, ME

Unique
- Pediatric hip fractures are uncommon.
- 85 to 90 percent of pediatric hip fracture cases are a result of high-energy trauma.4
- There is a paucity of literature describing best rehabilitation practices.
- Agility outcome measures, as well as observational and video gait analysis have not been fully investigated in the rehabilitation of pediatric hip fractures.2,3,5

Purpose
The purpose of this case report was to investigate the use of agility outcome measures, as well as observational and video gait analysis in the rehabilitation of a fourteen-year-old male motocross athlete with a hip fracture.

Foundation
- The use of the Agility T-test, Figure 8 Hop Test and the Lower Extremity Functional Scale (LEFS) has been well documented in adult athletes.
- Observational and video gait analysis have been shown to be useful outcome measures in the rehabilitation of children with cerebral palsy.1
- Gait analysis has been used successfully in adult athletes in evaluating running biomechanics and the effectiveness of intervention.
- While there is excellent data that supports the use of agility outcome measures, and gait analysis in neurologically affected pediatric patients and adult athletes, there is little data investigating the use in a pediatric hip trauma population.

Description
The subject was a fourteen-year-old patient who suffered a left posterior wall acetabular fracture from a motocross accident. He underwent surgical open reduction internal fixation (ORIF). His initial visit to physical therapy was 10 weeks after surgical intervention.

Interventions
- Therapeutic Exercises:
  - Non-Weight Bearing: Clamshells, weight shifts
  - Balance: Ball toss, wobble board, single leg stance, bosu step overs
  - Strength: Reverse bridges, 2 in. step downs, bosu squats, monster walks
  - Functional Activity: Ladders, Plyojumps, resisted walking & lateral hops
- Aerobic Capacity and Endurance:
  - Biking, reverse incline treadmill walking, agility tests, walk/jog

Agility Outcome Measures:
- Agility T-test and Figure 8 Hop Test, which occurred at week 7, 11, and 14.

Gait Analysis:
- Observational occurred continuously, with video analysis at 11 weeks

Table 4. Summary of System Review Findings

<table>
<thead>
<tr>
<th>Test</th>
<th>Initial Examination</th>
<th>Re-examination #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual Muscle Testing (LEFS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip Abduction</td>
<td>4/5</td>
<td>5/5</td>
</tr>
<tr>
<td>Hip Flexion</td>
<td>4/5</td>
<td>5/5</td>
</tr>
<tr>
<td>Gluteus Medius</td>
<td>4/5</td>
<td>4/5</td>
</tr>
<tr>
<td>Goniometry</td>
<td>Not Tested</td>
<td>100 degrees</td>
</tr>
<tr>
<td>Hip Abduction Right Leg</td>
<td>Not Tested</td>
<td>100 degrees</td>
</tr>
<tr>
<td>Hip Abduction Left Leg</td>
<td>Not Tested</td>
<td>35 degrees</td>
</tr>
</tbody>
</table>

Conclusions
A rehabilitation program that utilized agility outcome measures, as well as observational and video gait analysis was successful in treating a fourteen-year-old adolescent with a posterior wall acetabular fracture. Future research should investigate the range of uses of agility outcome measures and gait analysis for variable pathologies in adolescent patients.

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