Evaluation Tool distinguishes between children with post-traumatic elbow dysfunction and those with normal elbow function

BACKGROUND

- Elbow injuries are very common in children—approximately 8-9% of all upper extremity fractures in this population involve the elbow.
- Post-traumatic elbow dysfunction can be a complicated problem to diagnose and treat in children and adolescents, who manifest this condition differently than adults.
- Pediatric elbow injuries lead to unique challenges such as damage to open growth plates, propensity for dislocation, and long-term deformities.
- Current elbow evaluation tools are designed for adults and validated pediatric function questionnaires are not specifically designed to assess the impact of elbow dysfunction.
- Validated functional evaluation tools are important for assessing treatment options.
- Validated outcome measures generally consist of 2 parts:
  - Subjective: patient questionnaire regarding patient’s pain and daily activities
  - Objective: physician assessment of range of motion, functional measurements, and other relevant physical findings.
- We have combined existing elbow evaluation tools, a functional assessment that takes into account developmentally appropriate activities, and a physician assessment to develop the Pediatric Elbow Evaluation Tool (PEET).

OBJECTIVE

To determine whether the Pediatric Elbow Evaluation Tool distinguishes between children with post-traumatic elbow dysfunction and those with normal elbow function.

MATERIALS AND METHODS

PEET is composed of:

1. A questionnaire based on currently existing elbow evaluation tools such as the adult Liverpool questionnaire, the Pediatric Outcomes Data Collection Instrument, and the Patient-Reported Outcomes Measurement Information System, which have not been validated in the pediatric population for elbow dysfunction.
3. A functional assessment based on daily activities.

Selection Criteria

Patient Population:

- Ages 5-16 with unilateral, post-traumatic elbow dysfunction.

Control Population:

- Ages 5-16 without a history of elbow injury or upper extremity problems.

Exclusion Criteria

Developmental delay or medical complications that limit the subject’s ability to perform the activities and inability to understand English or Spanish.

Recruitment

Subjects were recruited from the Shriners Hospital for Children Northern California.

Control Population were recruited through a flyer posted around the hospital as well as in the clinic, often through siblings who accompanied patients.

Subjects and controls were recruited through a flyer posted around the hospital as well as in the clinic, often through siblings who accompanied patients.

Goal: 40 controls and 40 patients.

Data Analysis

A Mann-Whitney U-test was used to compare the patient and control group and to test the significance of each of the items of the three PEET components.

RESULTS

Patient Questionnaire

- All of the evaluation of pain questions rose to statistically significant (22 patients, 15 controls) as well as 8 of the 9 Liverpool Adult Questionnaire items (24 patients, 31 controls).

Physician’s Assessment

- Of the physician’s assessment, 6 of the 21 items (flexion ROM, extension ROM, ulnohumeral tenderness, radiocapitellar tenderness, crepitance, and ulnar nerve tinel’s sign) showed significant differences between groups.

CONCLUSIONS

Each component of PEET has elements that distinguish between children with post-traumatic elbow dysfunction and those with normal elbow function.

FUTURE DIRECTIONS

- Continue subject and control recruitment.
- Refine PEET based on items that are able to discriminate patient vs. control with statistical significance as well as examine individual components of the tool to examine ability of a section to stand alone as an evaluation tool.
- Validate PEET for differentiating between pre-op and post-op patients.

REFERENCES


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