

TITLE  
(USE ALL CAPITAL LETTERS)

**ADVANCED ULTRASONIC DIAGNOSIS OF  
EXTREMITY TRAUMA: THE FASTER EXAM**

Source of Acquisition  
NASA Johnson Space Center

AUTHORS & INSTITUTION

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**Introduction:** Ultrasound is of proven accuracy in abdominal and thoracic trauma and may be useful to diagnose extremity injury in situations where radiography is not available such as military and space applications. We prospectively evaluated the utility of extremity ultrasound performed by trained, non-physician personnel in patients with extremity trauma to simulate remote aerospace or military applications.

**Methods:** Patients with extremity trauma were identified by history, physical examination, and radiographic studies. Ultrasound examination was performed bilaterally by non-physician personnel with a portable ultrasound device using a 10-5 MHz linear probe. Images were video-recorded for later analysis against radiography by Fisher's exact test.

**Results:** There were 158 examinations performed in 95 patients.

|           | Forearm/Humerus | Tibia/Fibula | Femur | Hand/Foot | Soft-Tissue |
|-----------|-----------------|--------------|-------|-----------|-------------|
| True (+)  | 12              | 15           | 5     | 4         | 9           |
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The average time of examination was 4 minutes. Ultrasound accurately diagnosed extremity injury in 94% of patients with no false positive exams; accuracy was greater in mid-shaft locations and least in the metacarpal/metatarsals. Soft tissue/tendon injury was readily visualized.

**Conclusions:** Extremity ultrasound can be performed quickly and accurately by non-physician personnel with excellent accuracy. Blinded verification of the utility of ultrasound in patients with extremity injury should be done to determine if Extremity and Respiratory evaluation should be added to the FAST examination (the **FASTER** exam) and to verify the technique in remote locations such as military and aerospace applications.

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