

## Clinical Assessment of Force Plate for Predicting the Intensity of Disorder and Limit Differential Diagnoses in Steppage Gait

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### Abstract

In this research the kinematics parameters derived from ground reaction forces were evaluated to limit the differential diagnoses and measure the degree of disabilities during the walking among neuropathic subjects. 25 neuropathic subjects affected by drop foot and 20 normal subjects were enrolled in the study. There were no differences in the age, weight and height between the patients and normal subjects ( $p > 0.05$ ). Each subject was tested in average  $10 \pm 2$  times for calculating the kinetic parameters derived from ground reaction forces. Then time parameters and vertical components of force including three extremums of vertical forces, which state various phases in gait, anterior-posterior component of ground reaction force, maximum propulsion force, maximum braking force during loading stage, maximum propulsion force in the end phase of terminal stance, impact derived from the contact of the patient's foot with floor, loading rate and unloading of vertical forces during the contact phase of the patient's foot with floor and center of pressure displacement in sole of foot and friction coefficient between foot and floor were calculated. The results revealed that correlation between the first and second peaks of the anterior-posterior component of ground reaction forces, center of pressure displacement pattern in the sole of foot and time parameters of the vertical forces can be good indexes for differential diagnoses and measuring the degree of disabilities. This research can extend the clinical applications of ground reaction force plate, introduce suitable criteria to limit differential diagnoses and measure the degree of disabilities among the neuropathies. There is a need to replicate this research with more patients and normal subjects to confirm our findings.

**Keywords:** Neuropathy; Drop foot; Center of pressure; Gait; Kinetic; Disorder intensity

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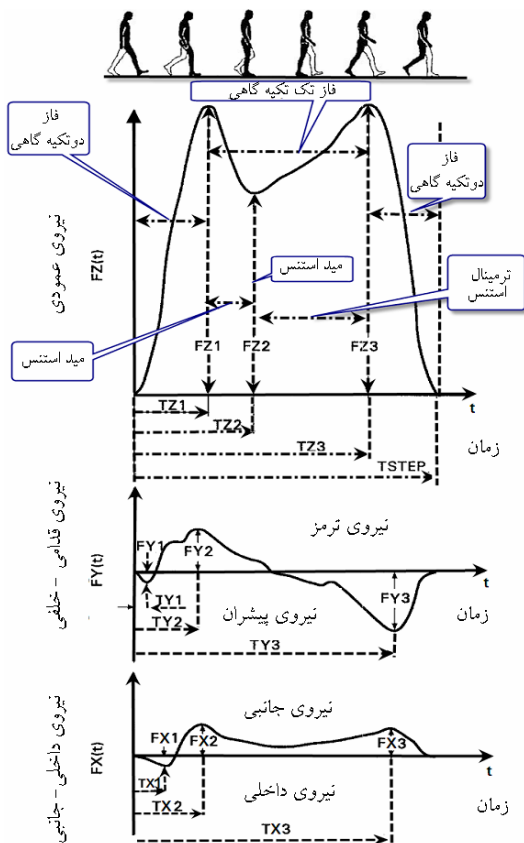
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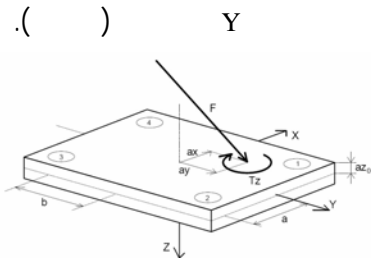


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<sup>8</sup> Strain gage

<sup>12</sup> Initial Contact

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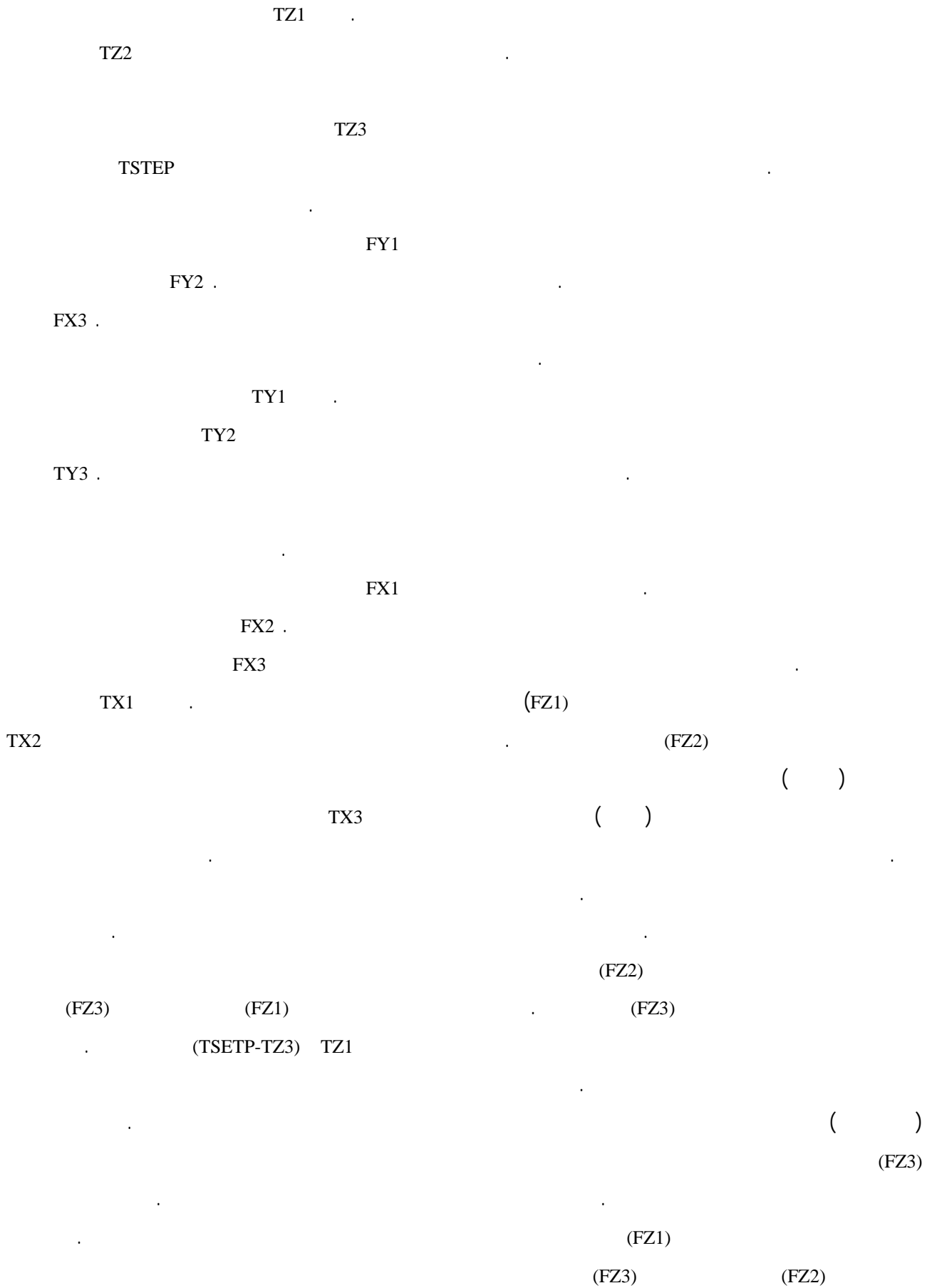
<sup>13</sup> Loading Response

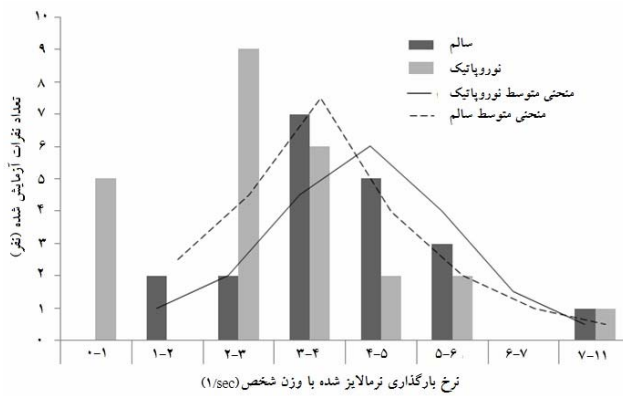
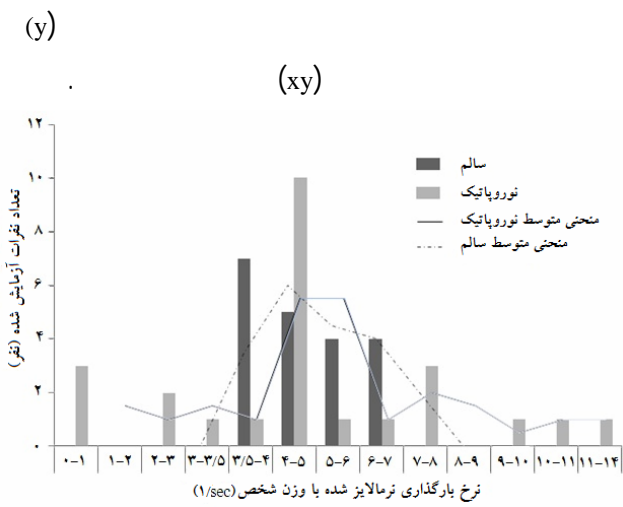
<sup>10</sup> Kistler Group

<sup>14</sup> Mid Stance

<sup>11</sup> Sensor

<sup>15</sup> Terminal Stance





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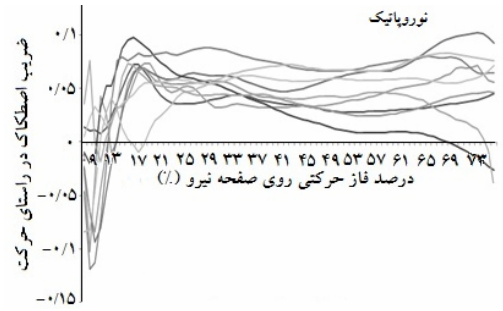
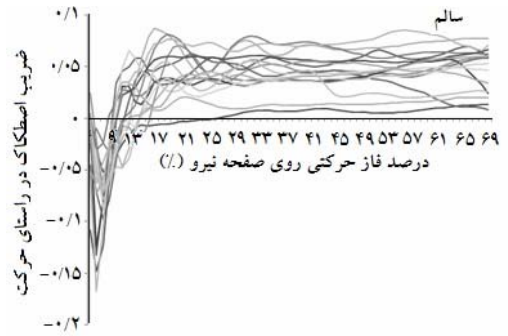
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<sup>17</sup> SPSS software  
<sup>21</sup> Spinal Cord Tumor

<sup>18</sup> T-test  
<sup>22</sup> Nerve injury –Radiculopathy

<sup>19</sup> Sciatic Palsy  
<sup>23</sup> Guillain Barre syndrome

<sup>20</sup> Spinal Muscular Atrophy

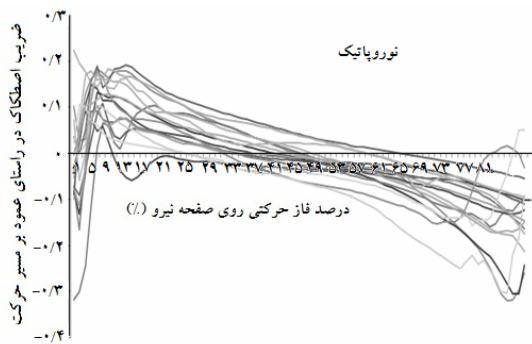
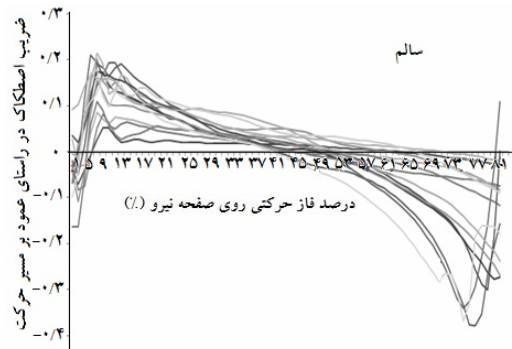


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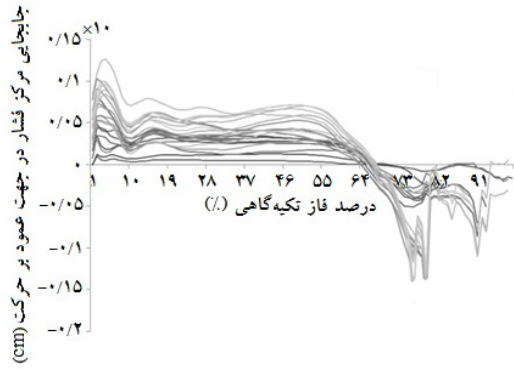
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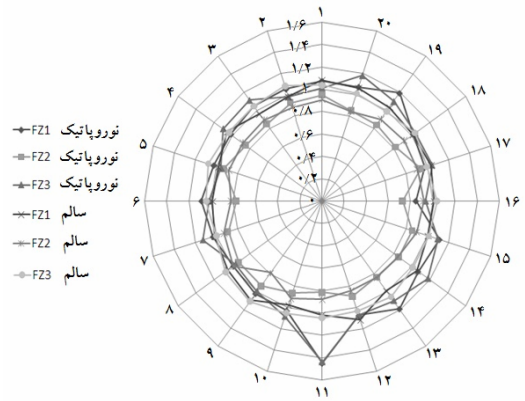


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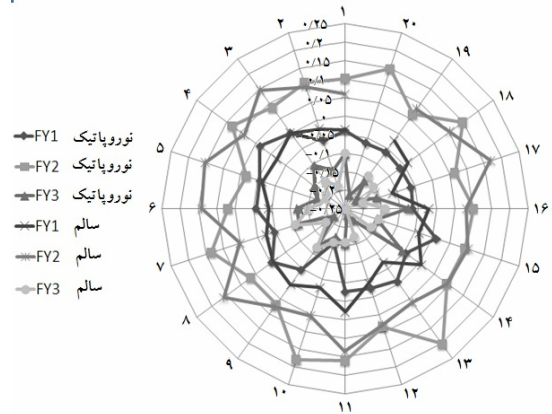


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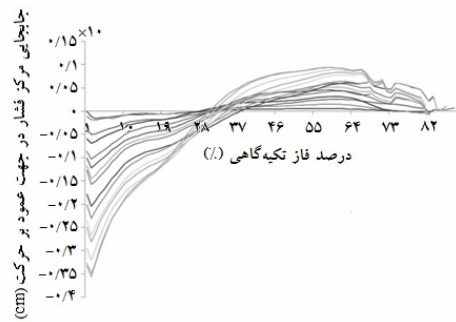
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