

Evaluation of Dexterity in Insulin-Treated Patients with Type 1 and Type 2 Diabetes Mellitus

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Abstract

Background:

Daily routine for insulin-treated patients with diabetes mellitus requires correct performance of self-monitoring of blood glucose and insulin injections several times a day. Dexterity skills may play an important role in the performance efficacy of these procedures.

Methods:

We collected data of insulin-treated (>10 years) patients with different age ranges [healthy controls, 14 female/11 male, age (mean $\pm$ standard deviation) 55 ± 7 years; type 1 diabetes mellitus (T1DM) patients, 12/13, 45 ± 9 years, disease duration 23.9 ± 6.5 years; T2DM patients, 8/17, 64 ± 6 years, 16.2 ± 6.9 years; T2DM patients (>70 years of age), 9/16, 75 ± 4 years, 19.7 ± 7.0 years]. After assessment of neuropathy (temperature, pain, and vibration perception), the patients participated in two dexterity test batteries [Jebsen-Taylor hand-function test (JHFT) and motoric performance series (MPS)].

Results:

Patients with type 2 diabetes showed disturbed vibration perception as compared to the other groups. The dexterity results were influenced by age to a large extent. Older T2DM patients performed worst in the majority of the subtests (e.g., JHFT, writing nondominant hand: control, 40.8 ± 11.7 s; T1DM, 46.3 ± 50.9 s, not significant versus control; old T2DM, 68.1 ± 29.5 s, $p < .05$; young T2DM, 52.5 ± 26.2 s, $p < .05$). Patients with type 1 diabetes showed similar JHFT and MPS results than the 10-year-old control subjects and performed outside of the age-dependent normal reference range.

Conclusions:

Manual skills and dexterity differed between the groups, and age-corrected reduced skills were common in both T1DM and T2DM patients in this study. Our findings underline the importance of considering dexterity and manual skills when designing medical devices for patients with diabetes mellitus.

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Abbreviations: (JHFT) Jebsen-Taylor hand-function test, (MPS) motoric performance series, (SMBG) self-monitoring of blood glucose, (T1DM) type 1 diabetes mellitus, (T2DM) type 2 diabetes mellitus

Keywords: dexterity, hand function test, motor function, neuropathy

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