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SYMPOSIUM

Plantar Pressure Distribution Patterns of Individuals with Prediabetes in Comparison with Healthy Individuals and Individuals with Diabetes

Caroline Cabral Robinson, M.Sc.,[1,2,3] Luciane Fachin Balbinot, M.D., Ph.D.,[4,5] Marcelo Faria Silva, Ph.D.,[6] Matilde Achaval, M.D., Ph.D.,[7] and Milton Antônio Zaro, Ph.D.[1,3]

Abstract

Background:

Since elevated mechanical stress along with loss of plantar protective sensation are considered relevant factors in skin breakdown resulting in diabetic foot ulcerations, the assessment of plantar pressure is important for the prevention of diabetic foot complications. Prediabetes subjects are at risk of chronic hyperglycemia complications, among them neuropathy, but information about plantar loading in this population is not available. We aimed to compare baropodometric parameters of individuals with prediabetes versus healthy persons and persons with diabetes mellitus (DM).

Methods:

Baropodometric data from 73 subjects (15 with prediabetes (pre-DM), 28 with type 2 DM, 30 healthy) aged between 29 and 69 years of both genders were registered through a pressure platform with self-selected gait speed and first-step protocol. Peak plantar pressure, stance time, percentage of contact time, percentage of contact area and pressure-time integral were assessed in five plantar foot regions: heel, midfoot, metatarsals, hallux, and toes 2 to 5. Groups were compared by one-way analysis of variance with Scheffé *post hoc* ($\alpha = 0.05$).

Results:

Age, body mass index, gender, and arch height index did not differ between groups. Pre-DM and DM subjects presented increased peak pressure and pressure-time integral in metatarsals ($p = .010$; $p > .001$), as well as increased percentage of contact time in midfoot ($p = .006$) and metatarsals ($p = .004$) regions when compared with healthy subjects. Stance time was significantly higher ($p = .017$) in DM subjects.

Conclusions:

Pre-DM subjects seem to exhibit an altered plantar pressure distribution pattern similar to that often found in DM subjects.

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Author Affiliations: [1]Institute of Basic Health Sciences, Federal University of Rio Grande do Sul, Porto Alegre, Brazil; [2]Department of Health Sciences, Federal University of Health Sciences of Porto Alegre, Porto Alegre, Brazil; [3]Laboratory of Biomechanics of the Brazilian Institute of Shoes and Leather Technology, Novo Hamburgo, Brazil; [4]Federal University of Rio Grande do Sul, Porto Alegre, Brazil; [5]College of Medicine, Federal University of São Paulo, São Paulo, Brazil; [6]Department of Sciences of Rehabilitation, Federal University of Health Sciences of Porto Alegre, Porto Alegre, Brazil; and [7]Department of Compared Histophysiologies and Morphologic Sciences, Institute of Basic Health Sciences, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

Abbreviations: (ADA) American Diabetes Association, (ANOVA) analysis of variance, (BMI) body mass index, (DM) diabetes mellitus, (DMG) type 2 diabetes mellitus group, (HG) healthy group, (IGT) impaired glucose tolerance, (MNSI) Michigan Neuropathy Screening Instrument, (NCT) nerve conduction test, (PDG) prediabetes group, (SD) standard deviation

Keywords: diabetic foot, gait, hyperglycemia, impaired glucose tolerance, secondary prevention

Corresponding Author: Caroline Cabral Robinson, M.Sc., Rua Sarmento Leite 500, 90046-500 Porto Alegre, Rio Grande do Sul, Brazil; email address carollinerobinson@gmail.com