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Falls, postural instability, and vestibular dysfunction in people with type 2 diabetes with and without diabetic polyneuropathy

Aims: To determine an association between vestibular dysfunction, falls, and postural instability in individuals with type 2 diabetes (T2D) with and without diabetic polyneuropathy (DPN) compared to a healthy control group.
Methods: This was a cross-sectional study of people with T2D with (n = 43) and without DPN (n = 32) and healthy controls (n = 32). The diagnosis of DPN was made using the Toronto criteria. Other parameters measured included cervical and ocular vestibular evoked myogenic potentials (VEMP). Postural instability was examined using a static posturographic balance system and calculated as an instability index (ST). Falls were recorded retrospectively during the past year.
Results: There was a great number of falls in people with T2D compared to healthy controls (T2D with DPN 38%, T2D without DPN 35%, controls 16%, p = 0.04). People with T2D had decreased postural stability, T2D with DPN, ST (median of 52 [iqi = 33; 77]), T2D without DPN, ST (median of 31 [iqi = 24; 39]), controls ST (median of 26 [iqi = 19; 33], p = 0.01), when comparing all three groups. People with T2D had a greater number of no-responses in oVEMP compared to controls (T2D with DPN 46.9%, T2D without DPN 58.1%, controls 28.1%, p = 0.04). Fallers with T2D had decreased oVEMP and cVEMP latencies on the right ears, when comparing to non-fallers, respectively, n10 (fallers [median of 16, iqi = 15; 19 ms] *vs.* non-fallers [median of 25 iqi = 16; 35 ms]); p13 (fallers [median of 16, iqi = 15; 17 ms] *vs.* non-fallers [median of 15, iqi = 8; 16 ms], p<0.05) irrespective of DPN.
Conclusions: Increased falls and postural instability were found in people with T2DM compared to controls with no difference in falls between those with and without DPN. However, there was greater postural instability in those with DPN compared to those without. People with T2D had more frequent no-response of the oVEMP indicating impaired vestibular nerve function.

Comments. Vestibular dysfunction is impaired in people with T2DM and DPN and can lead to falls. Falls and instability can be a hazard for people with T2DM and DPN as it can lead to impaired mobility, fall-related injuries, and increased mortality. This is an important manifestation of DPN that needs more attention. This is one of the first studies to address the impact of DPN on vestibular dysfunction and association of falls and postural instability. They found that falls and postural instability were more frequent in T2DM compared to controls. There were no differences between falls in those with and without DPN, however, postural instability was more pronounced in individuals with DPN.
In this study VEMP was used to test for vestibular function which is a direct assessment of vestibular function. Fallers with T2DM had shorter oVEMP (n10) and cVEMP (p13) latencies on right ears compared to non-fallers, irrespective of DPN. No-responses for the oVEMP latencies were more frequent in individuals with T2DM compared to healthy controls, demonstrating impaired vestibular end nerve function, irrespective of DPN. The authors mention a limitation of the study being many patients had newly diagnosed diabetes and only a mild degree of DPN which may account for no difference in VEMP between those with and without DPN (in contrast to Zhang J et al *Diabetol Metab Syndr. 2023;15:100*). The Toronto criteria were used to determine neuropathy which although a validated measure for clinical neuropathy may not identify small fibre neuropathy which may miss people with early neuropathy so may also account for the lack of difference. This study has laid the foundations for further research into vestibular dysfunction and its relationship with neuropathy.

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Reference. Jørgensen IEH, Devantier L, Tankisi H, Andersen H, Khan KS. The impact of vestibular dysfunction on falls and postural instability in individuals with type 2 diabetes with and without diabetic polyneuropathy. PeerJ. 2023 Nov 13;11:e16382. doi: 10.7717/peerj.16382. PMID: 38025708; PMCID: PMC10652841.
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