Background:
Management of physical activity in patients with diabetic foot disease is poorly understood. There is paucity of data, more specifically evidence from a randomized study investigating the levels and profiles of physical activity in this population. This study explores the quantification of physical activity as a function of offloading modality in patients with diabetic foot ulcers.

Method:
Thirty eligible subjects with non-infected, non-ischemic, plantar neuropathic foot ulcers were studied. Participants were randomized to one of two off-loading modalities; removable cast walker (RCW) or instant total contact cast (iTCC). Outcomes were assessed at wound healing or at 12 weeks, whichever came first. Primary outcome measures included duration of wound healing and dosage of activity. Spontaneous daily physical activity was monitored using an unobtrusive wearable sensor incorporated in a comfortable shirt and carried by participants for 48 hours. Activity was quantified by percentage of each main posture (sitting, standing, lying, and walking), total number of steps, longest episode of walking, number and duration of postural transition (sit-to-stand) per day.

Results:
No significant difference was observed for between group BMI and age indicating appropriate randomization. A higher proportion of patients were healed by iTCC (p=0.03). Results suggest that patients in RCW group have in average 12% higher number of steps per day than iTCC group. On the same note, the longest continues walking episode per day was 27% longer in RCW group. RCW group had higher number of postural transition per day in average by 33%. Interestingly a relatively high correlation was observed between the number of postural transition and duration of wound healing (r=0.6, p<0.001). No significant difference was observed for other measured activities.

Conclusions:
This study for the first time demonstrated the detailed profiles of physical activity between the two treatment groups. These data may help in addressing the missing gaps in clinically dosing physical activity for the target population for better wound healing outcomes. The group treated with RCW were more active than iTCC group which may indicate the lack of adherence in RCW group in wearing the prescribed footwear during everyday condition.