

### 3-D-Optical Imaging in Diabetic Foot Care of Children

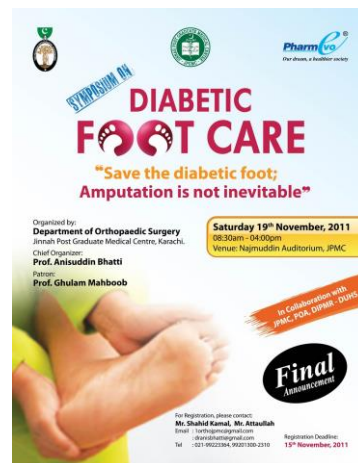
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From left to right, feet study in the attention position and during normal gait

Diabetes in children presents additional problems in terms of their feet care as they are by nature robust and active, indulging in play and activities involving climbing, jumping, running and walking. Polished, properly-fitting-pure-leather shoes (shoes with damaged internal surface should be, immediately, discarded) and clean, pure-cotton socks (disinfectant powder should be applied before putting on socks) should be worn for school, replacing dress shoes with sport shoes/trainers for sport participation. Whenever children go out in the garden, backyard or playground, they should be mandated to put on socks and sport shoes. Too loose (foot support may be used to adjust such shoes) or too tight shoes should not be used. The former increase the chances of accidents and injuries and the later may block circulation. Parents should inspect feet of diabetic children upon arrival from school or sport events for blisters, cuts, sores or warts. If any such condition is suspected, a podiatrist should monitor the feet using visual, photographic and video means in the attention position (posture study) as well as during walking and running (gait study). The soles and the upper surfaces of feet must, also, be studied using moiré fringe topography (providing 3-D surface map) and rasterstereography (providing 3-D curvature map) — stereophotogrammetric, non-contact, non-invasive, non-infecting, non-destructive techniques providing permanent digital record. Edge-based moiré and edge-based raster could be employed to quantify infinitesimal movements during a gait cycle. Study of soles of feet on sand would provide clues to vascular-system disorders triggered by diabetes. Facilities available in the SF-Growth-and-Imaging Laboratory include anthropometry (heights to accuracies of 0.01 cm and

masses to 0.01 kg, respectively, growth-and-obesity profile software, moiré fringe topography, rasterstereography and video analysis. In order to prevent diabetes in children, it is recommended to keep track of their growth-and-obesity profiles from 3 years onward. The children should, also, be monitored if they are under excessive pressure to excel (by teachers, parents, sports coaches). Any form of abuse (neglect, bullying, verbal, physical, sexual) may, also, contribute to diabetes. In case, a child is diagnosed with diabetes, the disease should be treated with a proper combination of diet, exercise and lifestyle adjustment.



**Keywords:** Moiré fringe topography, rasterstereography, edge-based algorithm, posture, gait, diabetes, feet

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