Purpose:
To compare step&shoot and dynamic MLC-based IMRT for prostate treatment.

Methods:
Patient data with prostate cancer was selected. Same beam geometries and energy were used. Treatment plan includes simultaneous irradiation of prostate to 82Gy and seminal vesicles to 64Gy (41 fractions). Plans were normalized to achieve 82Gy minimum dose to prostate. Step&shoot was delivered using Primus linac (Optifocus MLC, 10mm leaf-width, 200MU/min) and Konrad v2.2 TPS (Siemens). MLC step-size of 0.5cm, minimum of 3 MU per segment and 15 intensity levels was used. Dynamic was delivered using Clinac 21EX (Millenium MLC, 0.5cm leaf-width, 300MU/min) and Eclipse v8.1 TPS (Varian). MLC step-size was 0.2cm. Plans dose distributions were compared in PCRT3D TPS (TRF). Optimization and dose calculation time, treatment time, MUs, PTVs and OAR DVH analysis and treatment plan QA were compared for both techniques.

Results:
Optimization and dose calculation time was 220seg for S&S and 360seg for dynamic. Total MU was 508 for S&S and 577 for dynamic. D98% (V82Gy) for PTV prostate were 81.5Gy (95.7%) for step&shoot and 80.1Gy (84.6%) for dynamic respectively. D98% (V64Gy) for PTV seminal vesicle were 64.2Gy (98.2%) for S&S and 62Gy (92.3%) for dynamic respectively. Rectum, V40Gy, V65Gy and EUD were 56.6cc, 21.2cc and 65.1Gy for S&S and 55.7cc, 19.7cc and 63.3Gy for dynamic respectively. Bladder V65Gy and EUD were 27.4cc and 47.9Gy for S&S and 24.4cc, and 46.2Gy for dynamic. Femoral head D10% were 40.4Gy for S&S and 39.3Gy for dynamic. Treatment time was 531seg for S&S and 271seg for dynamic. Both treatment plans QA are within tolerances.

Conclusions:
Both IMRT modalities could be used for prostate treatment. Calculation time and MU are lower with S&S. D98%, V82Gy and V64Gy are slightly better using S&S. OAR doses are few percent better using dynamic. Treatment time is 50% less with dynamic.