Purpose:
The purpose was to analyze the influence of the step size during head&neck IMRT treatments.

Methods:
Ten patients with head&neck IMRT treatment plan were selected. Treatment plans were done using nine 6MV photon-beams on a Primus linac (Siemens) with Optifocus MLC (10mm leaf width) and a dose rate of 200MU/min. The TPS used was Konrad v2.2 (Siemens) with leaves step size of 10, 5 and 3mm. For each step-size, plans were evaluated in terms of MU, segments number, treatment time, PTV’s (66Gy and 50Gy) dose uniformity and OAR (parotids and spinal cord) doses. Variations between measured and calculated total plan doses were obtained using solid water phantom and PTW PinPoint ionization chamber.

Results:
The MU number for 10mm step-size plans was 624 [495,770] and increased 51% [36%, 87%] for 5mm and 124% [93%, 171%] for 3mm.
The segments number for 10mm step-size plans was 111 [99,129] and increased 41% [27%, 52%] for 5mm and 102% [71%, 125%] for 3mm.
The treatment time for 10mm step-size plans was 11.47min [11.08min, 12.45min] and increased 24% [9%, 33%] for 5mm and 65% [27%, 74%] for 3mm.
Reducing the step-size from 10mm to 5mm leads to better PTV_66Gy dose uniformity within ICRU50 tolerance (no difference observed between 5mm and 3mm). Step-size diminution from 10mm to 3mm leads to a better coverage of PTV_50Gy especially in patient surface regions. For all the studied plans there are no differences in the parotids mean doses and spinal cord maximum dose.
The variation between measured and calculated doses was 1.1% for 10mm step-size. It increased 1.7% and 2.4% for 5mm and 3mm respectively.

Conclusions:
Using 10mm step-size produces plans with adequate OAR doses. PTV Dose uniformity and volume coverage could be improved by 5mm step-size whereas 3mm step-size produces larger treatment times without advantages in dose distribution.