Purpose: Treatment of tumor adjacent to treated tumor require analysis of disciplinary pattern of dose in the region between 50% to 5% on target volume, though the penumbra at the edge of the tumor depends on physical parameters like collimator used. In this work the penumbra (let us define clinical penumbra 40% to 10% since 50% chosen as reference calculated with simple formulas when selected isodose is 50%, was evaluated from clinical result around the tumor.

Methods: The arbitrary sample of 35 cases from our treatment cases by LGP analyzed in order to find relation to 50% isodose line for the dose regions 40 to 5%. The DVH of these arbitrarily taken 35 cases were used to find out the volume from the matrix for 50% to 5%. Then these volumes were normalized to 50% volume.

Results: Normalized mean volume with respect to 50% volume irrespective of volume size was derived for isodoses 40% to 5%. The normalized mean volume was calculated as (1.55, 3.97, 7.9, 11.3 with 1 sigma 25%) for the isodoses (40, 20, 10, 5). By knowing the mean simply substituting in the volume for sphere formula, incremental radius dr with respect to r(radius of tumor) can be derived. By using this derived formula \( dr = r(\text{mean dose volume}^{1/3} - 1) \) the distance of 40% to 10% can be obtained and finally penumbra can be derived for multi shots target cases. This experimentally derived penumbra is function of r. The penumbral region(40% to 10%) obtained as 0.67*r. Then the cases were analyzed using this formula and spread was analyzed and it is function of r.

Conclusions: This paper is mainly aimed for clinical fall off in the patient due to multi-shots spread inside the volume. Any adjacent tumor can be treated by knowing above information without damaging or involving much risk.