INTRODUCTION
Dentin is comprised of the intertubular dentin, the tubules and highly mineralized peritubular cuffs. These features vary with distance from the pulp, physiology and traumatic history of the tooth [1, 2]. Previous studies have shown that tubule density and their distribution affect the mechanical properties of dentin [3]. Tubule organization also influences the etching and demineralization processes that are essential for bonding to dentin [4].

OBJECTIVES
The primary objective of this investigation was to quantify the lumen density and tubule diameters in human dentin as a function of distance from the pulp, and to compare the spatial arrangement of tubules in the teeth of patients from the United States and Colombia.

MATERIALS AND METHODS
Dentin disks 2 mm wide were sectioned from coronal dentin of caries-free unrestored 3rd molars obtained from young patients (18/age:35) of the US (n=31) and Colombia (n=6). The specimens were sectioned parallel to the occlusal surface and were obtained at different depths from the dentin enamel junction (DEJ) i.e. outer dentin (n=11), middle dentin (n=14) and inner dentin (n=12) as shown in Figure 1. The specimens were polished, dehydrated in air for a day and then sputtered.

RESULTS AND DISCUSSION
The average number of tubules per square millimeter and lumen diameter near the pulp are 43000/mm² and 1.6 µm, respectively. In the middle of the dentin, these quantities are 30000/mm² and 1.4 µm, respectively, whereas near the DEJ these values are 20000/mm² and 1.2µm. Tubule characteristics obtained from teeth of Colombian and US patients showed similar trends (Figure 3). The increase in lumen density with distance from the DEJ influences the fatigue properties of dentin as shown in Figure 4 [5]. Overall, the regions with lower tubule density (i.e. peripheral dentin) appear to be the most resistant to the initiation and propagation of fatigue cracks.

CONCLUSIONS
Results from the present study confirmed that tubule densities are lowest at the DEJ and highest at the junction with the pulp chamber. There were no difference in the tubule characteristics between the dentin of teeth from Colombian and US patients. However, regions of random tubule distributions and clusters were identified, which can change the flaw sensitivity of the tissue under cyclic loading.

ACKNOWLEDGEMENTS
This work was supported by grant R01 DE016904 and fellowship T32DE07309-1 from the National Institute of Dental and Craniofacial Research (principal investigator Dwayne D. Arola).

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