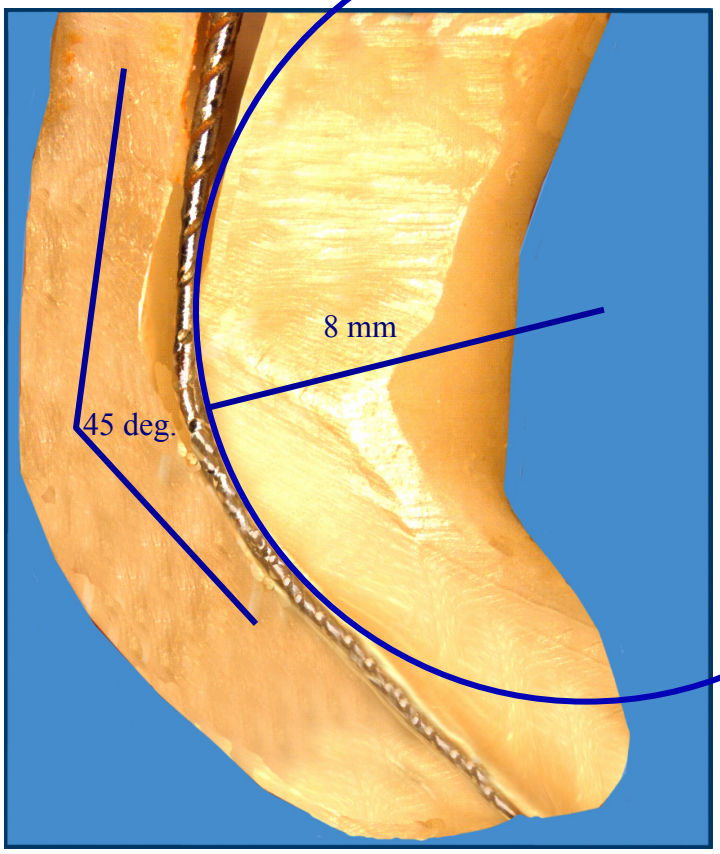
31. What does testing tell us about avoiding file fatigue?

With the frequency of curvatures, we should assume their presence in a plane that is not apparent on x-ray examination. Only with very careful consideration of variations in the pressure required for progressing into the canal do we determine if curvatures are threatening file failure. One of the greatest problems in making that determination is the force required for rotating a large diameter file relative to the force necessary to progress through a curvature. Gauging the depth that the file can be inserted into the canal before the file is rotated can be helpful in determining the resistance due to curvature as opposed to the resistance caused by a constricted canal. Knowing the limitations of the file size determined from testing relative to the canal anatomy can definitely improve the ability to avoid file failures due to fatigue or torsion.



The illustration represents a curvature having a 8mm radius and a 45 degree angle 9 mm from the tip of the file. This curvature was duplicated in a glass tube. Files were inserted to the 9mm depth and rotated passively at their respective speed until failure. The RaCe files were rotated at 500 rpm and the Light Speed files were rotated at 2,000 rpm. There is an inverse relationship between the file diameter and the length of time required for failure. The results of the Light Speed files are uncharacteristic of their dimensions.

Protaper	Profile GT	Profile	K-3
S1—7s	20/04—50s	20/04—64s	20/04—62s
S2—5s	20/06—8s	20/06—12s	20/06—9s
F1—6s	30/06—5s	30/06—8s	25/06—7s

Quantec	RaCe *	Light Speed*
25/04—25s	25/04—25s	20—49s
25/06—11s	25/06—8s	30—14s
35/02—160s	35/02—64s	35—6s