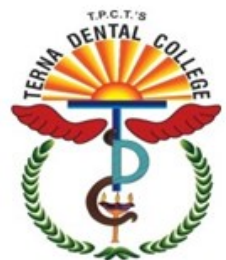
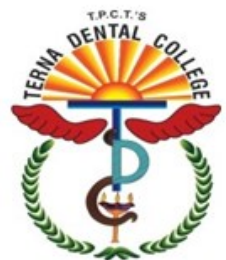


# STANDARDIZATION OF ENDODONTIC INSTRUMENTS



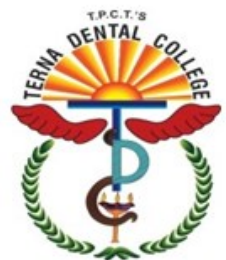
# OBJECTIVES

- TO UNDERSTAND THE STANDARDIZATION OF ROUTINELY USED ENDODONTIC INSTRUMENTS
- TO UNDERSTAND THE CLASSIFICATION OF DIFFERENT ENDODONTIC INSTRUMENTS USED
- TO KNOW THE DIFFERENCE BETWEEN COMMONLY USED INSTRUMENTS SUCH AS K FILE, H FILE AND REAMERS



# cONTENTS

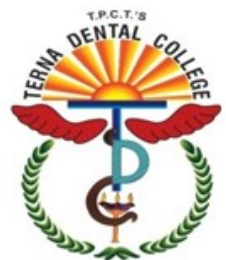
- INTRODUCTION
  - CLASSIFICATION
  - STANDARDIZATION OF ENDODONTIC STAINLESS STEEL INSTRUMENTS
  - INGLE AND LEVINE'S STANDARDIZATION OF ENDODONTIC HAND INSTRUMENTS
  - COLOR CODING OF FILES AND REAMERS
  - K-TYPE REAMERS AND FILES
  - HEDSTROM FILES
- CONCLUSION
- TAKE HOME MESSAGE



# INTRODUCTION

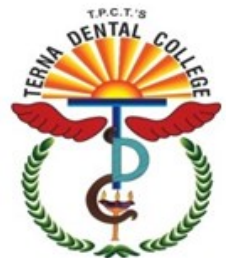
- Instruments play a very important role in the success of a root canal treatment therefore a basic knowledge of endodontic instruments is essential.
- General guidelines exist for root canal preparation, but due to the complex and varied canal anatomy each case presents unique challenges.

A variety of instruments are thus available for this purpose.



# INTRODUCTION

- The technical demands and level of precision required for successful performance of Endodontic procedures is achieved by careful manipulation of instruments and by strict adherence to biological and mechanical principles.
- Although the armamentarium of endodontics has grown in complexity over the past 30 years, yet, the basic instruments used today are not much different from those used at the turn of the century.



# CLASSIFICATION

- Grossman's Classification of Endodontic Instruments Based on Method of Use:

## Group I: Hand-operated endodontic instruments

- Barbed broaches and rasps
- K-type reamers and files
- Hedstroem files

## Group II: Low-speed instruments with latch type attachments

- Gates-Glidden drills
- Peeso reamers

## Group III: Engine-driven instruments

- Rotary NiTi endodontic instruments
- Reciprocating instruments
- Self-adjusting file (SAF)

## Group IV: Ultrasonic and sonic

# CLASSIFICATION

- Grossman's Classification of Endodontic Instruments Based on their Function:

## Exploring instruments:

- To locate the canal orifice and determine patency of the root canal. E.g. endodontic explorers, smooth broaches (pathfinders).

## Debriding instruments:

- To extirpate the pulp and remove any foreign debris. E.g. barbed broach

## Cleaning And shaping instruments:

- To clean and shape the root canal laterally and apically e.g. reamers and files.

## Obturating instruments:

- To cement and pack gutta-percha into the root. E.g. spreaders, pluggers and lentulospirals.

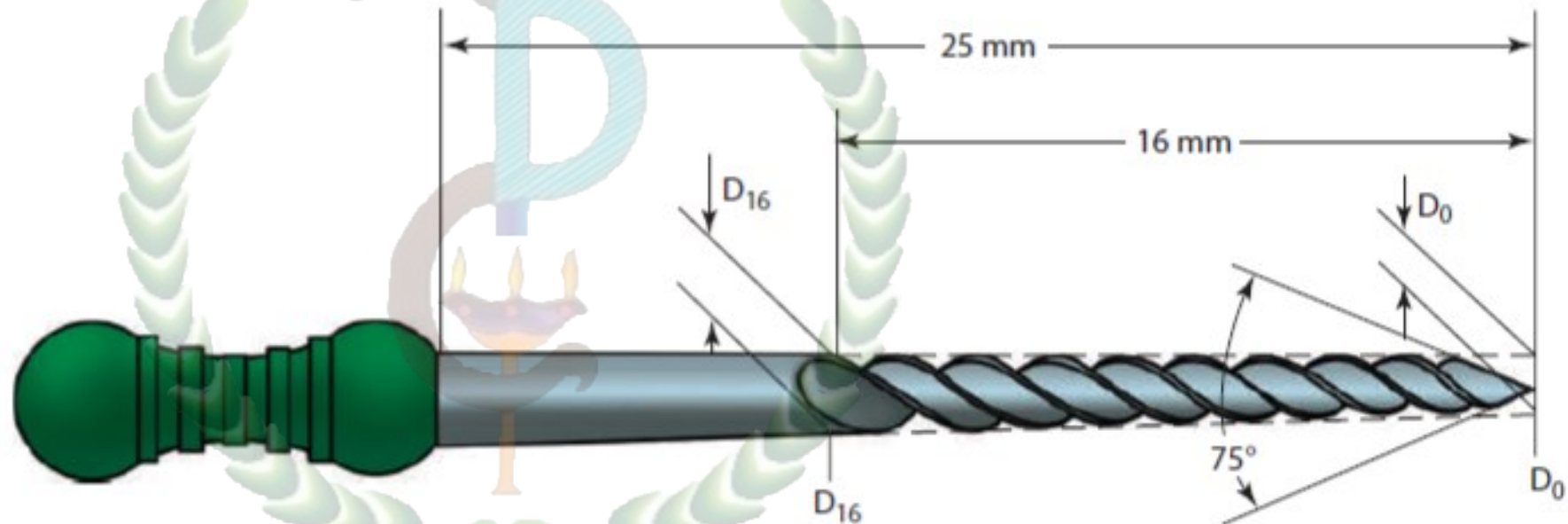
# Standardization of Endodontic Stainless Steel Instruments:

- Initially, root canal instruments were made according to the manufacturers, with no definite specifications regarding diameter, taper, or length of the cutting blades.
- Ingle and LeVine suggested a definite increment in diameter as the size progressed while maintaining a constant taper of all blades regardless of size.



## Ingle and LeVine's Standardization of Endodontic Hand Instruments

- The diameter of D16 shall be  $32/100$  or 0.32 mm greater than that of D0; e.g., a No. 20 reamer shall have a diameter of 0.20 mm at D0 and a diameter of 0.20 plus 0.32 or 0.52 mm at D16.



# Ingle and LeVine's Standardization of Endodontic Hand Instruments

Following specifications were added later:

- The tip angle of an instrument should be  $75 \pm 15^\circ$ .
- Instrument sizes should increase by 0.05 mm at D0, between Nos. 10 and 60, e.g., Nos. 10, 15, and 20, and they should increase by 0.1 mm from Nos. 60 to 150, e.g., Nos. 60, 70, and 80.
- Nos. 6 and 8 have been added for increased instrument selection.
- In addition, instrument handles have been color coded for easier recognition.

# Color coding of Files and Reamers

COLOR CODE	NEW NUMBER
Pink	6
Gray	8
Purple	10
White	15
Yellow	20
Red	25
Blue	30
Green	35
Black	40



# K-type Reamers and Files

- Motion of use —
- Files: Penetration, rotation, and retraction; and filing or a rasping motion (once canal patency is achieved).
- Reamers: Penetration, rotation, and retraction

*How do you differentiate between a file and a reamer?*

The number of flutes twisted into each blade of a similar-sized instrument determines whether that instrument is a reamer (less flutes) or a file (more flutes). For example, a No. 30 reamer may have 15 flutes per 16-mm blade, and a No. 30 file may have 22 flutes per 16-mm blade

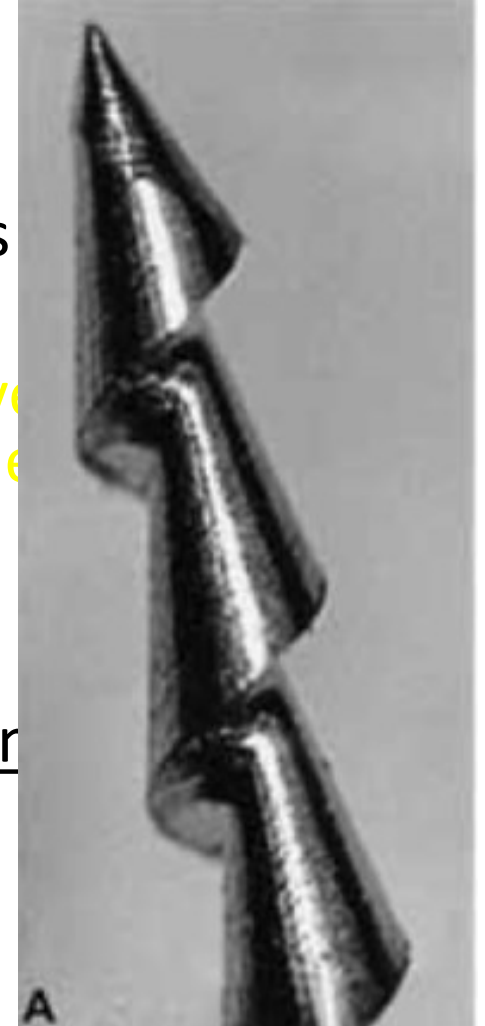


# What is the difference between files and reamers?

	FILES	REAMERS
Cross section	Square	Triangle
Area of cross section	More	Less
Flutes	More	Less
Flexibility	Less	More
Cutting motion	Rasping penetration (Push and pull)	Rotation and retraction
Preparation shape	Usually ovoid	Round
Transport of debris	Poor (because of tighter flutes)	Better (because of space present in flutes)

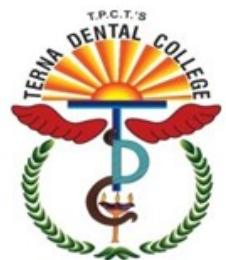
# Hedstrom Files

- Manufactured from a **round stainless steel wire**.
- Produces spiral flutes (resembles cones or a screw)
- Has higher cutting efficiency than K-instruments, but it is fractures easily.
- The better cutting efficiency is attributed to its **more positive** and to its **blade which has a cutting rather than a scraping angle**
- NOTE: Always employ the Hedstroem file in only one direction and never in a torquing action.



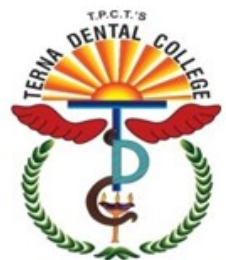
# CONCLUSION

- From a biological perspective, root canal treatment is directed toward the elimination of micro-organisms from the root canal system and the prevention of reinfection.
- Standardization of instruments and technological advances have led to dramatic improvements in the ability to shape root canals with potentially fewer procedural complications.



# TAKE HOME MESSAGE

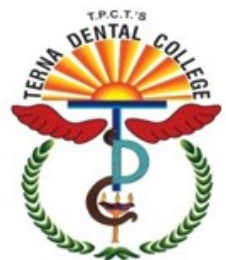
- Endodontic instruments should be used sequentially and with utmost care to avoid instrument separation.
- Instrument should be sterilized after each use.
- Instrument should be discarded if bent or kinked.
- If biomechanical preparation is completed after following each step meticulously, it would lead to a successful outcome.





# PROBABLE saq's & Laq's

- Write a note on standardization of endodontic instruments
- Difference between K file/H file/ Reamers
- Classify endodontic instruments





**THANK YOU!**

