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Dental Instruments

A POCKET GUIDE

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DENTAL INSTRUMENTS: A POCKET GUIDE

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To William W. Tanner, DDS

Thank you for the extraordinary dental experiences that lead to my passion for dentistry.

*In memory of Hazel Torres for her encouragement and inspiration in developing
the beginning concepts of this textbook.*

Preface

As the science and technology of dentistry continues to evolve, it is more important than ever that clinicians have an excellent understanding of the instruments and equipment they will encounter in practice. This fourth edition of the dental instrument textbook adds new instruments and equipment to stay current with these changes. However, while basic dental instruments and equipment have remained relatively unchanged throughout the years; there have also been many new advancements made to accommodate new developments in the dental field. Examples can be seen in the special coatings available on some instruments (i.e., the titanium coating found on composite instruments) that allow these instruments to be adapted to the different types of materials and the significant advancement of radiology equipment.


The text is designed to help both students and practicing professionals master the identification and use of common and specialty dental instruments and equipment. Whereas certain chapters focus on the instruments used in all dental practices (i.e., components of the basic tray setup, the anesthetic syringe and its parts, evacuation devices, etc.), other chapters are designed around various dental procedures, such as the instruments used in hygiene, amalgam, and composite procedures. The dental specialty chapters include instruments used in orthodontics, endodontics, and periodontics. Two chapters focus on oral surgery—one chapter

addresses the general instruments used in oral and periodontal surgery, and the other focuses on extraction and implant instruments. There are also chapters devoted to dental material and radiography equipment. In addition, examples of tray setups are provided for many chapters, enhancing the reader's ability to set up trays and use the instruments in the correct sequence, depending on the procedure.

NEW TO THIS EDITION

- **All new photos in Chapter 2: Enamel Cutting Instruments**, including both full instrument and close up views, enhancing the working ends of the instruments to assist in easier identification.
- **More “in use” photos** showing the instrument/equipment being used with a patient or by a practitioner.
- **Addition of new instruments/equipment** including: The Wand STA Single Tooth Anesthesia System, Isolite, self-contained water unit and waterline treatment tablets, air polisher, radiometer/halogen radiometer, Eezee-Grip Digital Sensor Holder, XCP-ORA One Ring and Arm Positioning System, Cone Beam 3-D Imaging System, and SCANX digital imaging system.

FORMAT

- **Flip-book, Flashcard Style.** Two pages are devoted to each instrument—the top containing the image(s) and the bottom featuring the description (**name, functions, characteristics, and notes**). Great for quizzing or self-testing.
- **Practice Note.** Practice notes give examples of the tray setup(s) in which a particular instrument can be found and any other useful information. It cross references the instrument to tray setups in other chapters and dental procedures.
- **Sterilization Note.**  Sterilization notes provide information regarding infection control, sterilization, and/or disposal protocol for each instrument or piece of equipment. These guidelines have been taken from the most current issue of Guidelines for Infection Control in Dental Health-Care Settings–2003 (Centers for Disease Control and Prevention. MMWR 2003;52[No. RR-17]:1 to 48, U.S. Department of Health and Human Services, Atlanta, GA 30333.) *Note:* It is important to review and follow the local and state regulations in which you practice as each city and state may have their own regulations.
- **Tray Setups.** Examples of tray setups included in specific chapters show how the instruments would be set up for specific procedures. In most instances, only the instruments are included, the auxiliary items are not.

EVOLVE

For the Student ►

- **Chapter Quizzes.** Chapter quizzes included for each chapter help students assess their knowledge.
- **Drag-and-Drop Exercises.** Drag-and-drop exercises test students' skill at selecting the correct instrument in the right order for specific tray setups.
- **Appendices.** Five appendices provide information on instrument grasps, a sterilization management system, operating zones, the anesthetic color codes, and instrument sharpening.
- **Weblinks.** Variety of weblinks provided for further study and research.
- **Videos.** Videos showing an explorer in use, preparation of the anesthetic syringe, rubber dam placement, and more.

For the Instructor ►

- **Image Collection.** Image collection includes every photo/drawing in the book.
- **Teaching Tips.** A list of helpful tips for each chapter designed to assist instructors in enhancing their courses.
- **Testbank in ExamView.** A 300+ question testbank (along with the correct answers) that can be sorted by chapter or randomly, making the creation of quizzes and exams easier.
- **Tray Setup Quizzes.** Exams designed to test students' knowledge of which instruments are used on specific tray setups.

I am confident that this text will help you to more easily learn the dental instruments, dental equipment, and tray setups that clinicians use in dental practices. It is imperative that all students begin their career with a thorough knowledge of dental instruments and equipment. Certainly, this text will help you achieve that goal. I wish you all success in the field of dentistry. I know you will be a great asset to the profession.

Linda R. Bartolomucci Boyd

Acknowledgments

I would like to express my deepest appreciation to all of my colleagues, dentist affiliations, professors, and my dearest family and friends for all of their insight, support, love, and prayers during the writing of this fourth edition. Of course, I appreciate and value each and every student, as their zest and enthusiasm for learning give me such encouragement to write a text that enhances their learning.

Two people have played an incredible role in making this text such a great learning tool with the availability of the instruments and the creative skill in photography. First and foremost I have the greatest respect for Jeff McMillan in his ability to photograph dental instruments. His keen eye, artistic ability, and incredible photography skills have enhanced this text with clearer and more precise photographs, especially of the close up working ends of dental instruments. Secondly, these photographs would not be possible without Andrew Hartzell, President of G. Hartzell & Son, Inc., who allowed us to borrow most of the instruments to photograph. Thank you, Andy!

I am extremely grateful to Courtney Sprehe for her perseverance in developing the fourth edition of this text, as her vision and mine have remained the same from the second edition to now the fourth. John Dolan and Kristin Hebbard, I thank you for your expertise as editor in overseeing and publishing this fourth edition.

I continue to express many thanks to **Joyce M. Litch, RDH, DDS, MSD**, a consultant to the book, who was willing at any time of the day to answer questions regarding the periodontal and hygiene chapters. I thank you for always being there for me! The bur chapter would not be as comprehensive without the consultation from Wayne Joseph, DDS. His insight into this chapter has been appreciated from the first edition to the fourth.

I would like to express my deepest and sincere appreciation to all of my colleagues for their continued support during the development of this text, especially Anna Nelson, MS, CDA, RDA, BA, who was always available and willing to answer any of my questions and Sharon Campton, MS, CDA, RDA, who reviewed the third edition to help bring the fourth edition to the next level. Cathy Clarke, BA, RDA, spent numerous hours consulting with me regarding the new features of this text. Thank you, Cathy, for the many hours you devoted. A very special thanks to Paul Charles Hans, an author himself, for his insight to the preface of this textbook.

I could not have written this fourth edition without the love, support, and prayers from my family: my sons, Michael and Matthew, who always gave me a nudge of encouragement; my daughter-in-law, Rebecca, for her love; Felicia, for her smiles of support, my cousin, Elaine Strizzi, for her gentle and loving encouragement; my brother and sister-in-law, Ray and Meri, for the nourishment of my body and soul during this process; and Nick Reina, SDB, for your prayers

of wisdom. Last, but certainly not least, are the wonderful, refreshing moments with my grandchildren, Christian, Collin, Liberty Rae, Alexis, Sierra, and Jaxson, that teach me the simplicity, enthusiasm, and zest for learning that encourages my writing.

Linda R. Bartolomucci Boyd

For information about the author or to ask questions about the text, please visit www.lindaboyd.info/.

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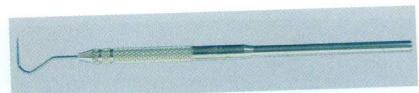
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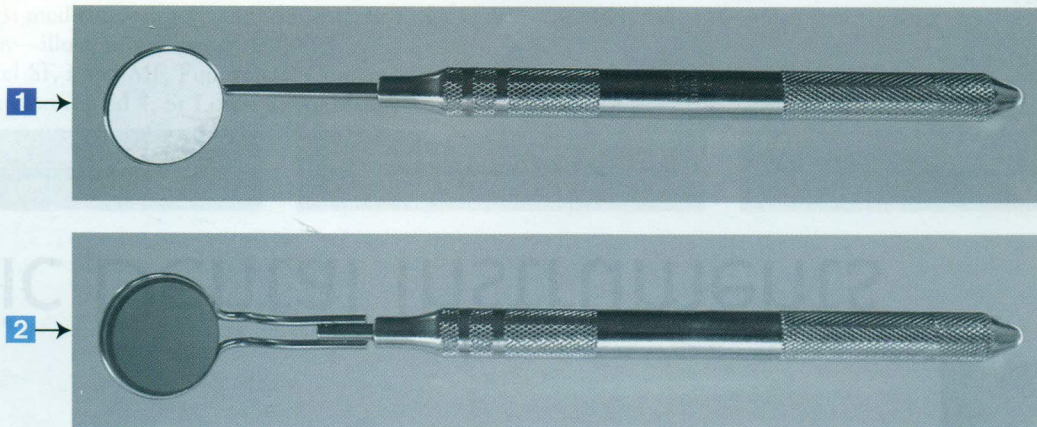
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1

Basic Dental Instruments





■ INSTRUMENT Mouth Mirror

- Functions ▶**
- To provide indirect vision
 - To retract lips, cheeks, and tongue
 - To reflect light into the mouth

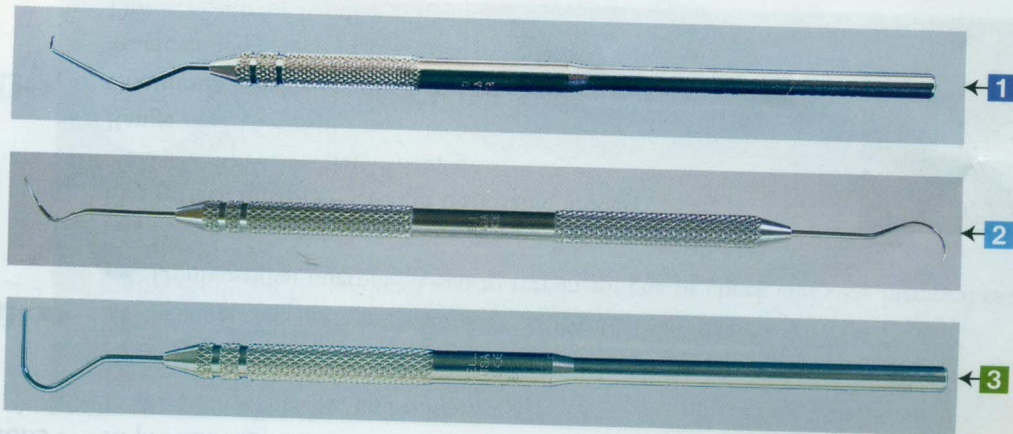
- Characteristics ▶**
- 1** Front surface mirrors—Accurate, distortion-free image
 - 2** Double-sided mirrors—Used to retract tongue or cheek and view intraoral cavity simultaneously

Flat surface mirrors—Used in disposable models
 Concave mirrors—Magnify image
 Range of sizes
 Commonly used sizes: no. 4 and no. 5
 Single ended
 Different mirror handles available

Practice Note ▶ Mouth Mirror is used on most tray setups.

S Mouth Mirror must be cleaned, bagged individually or bagged/wrapped in a tray setup, and then sterilized. A chemical/steam indicator device should be included in the wrapping.





■ INSTRUMENT Explorers

Function ▶ To examine teeth for decay (caries), calculus, furcations, or other abnormalities

Characteristics ▶ Pointed tips; sharp, thin, flexible
Single or double ended

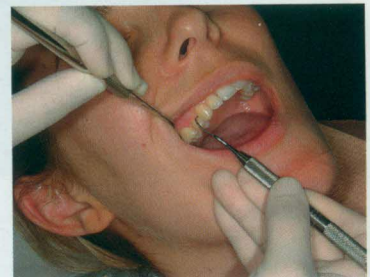
- Double-ended models—May have different styles of working ends; may also have explorer on one end and periodontal probe on the other end (for periodontal probe, see Chapter 16).

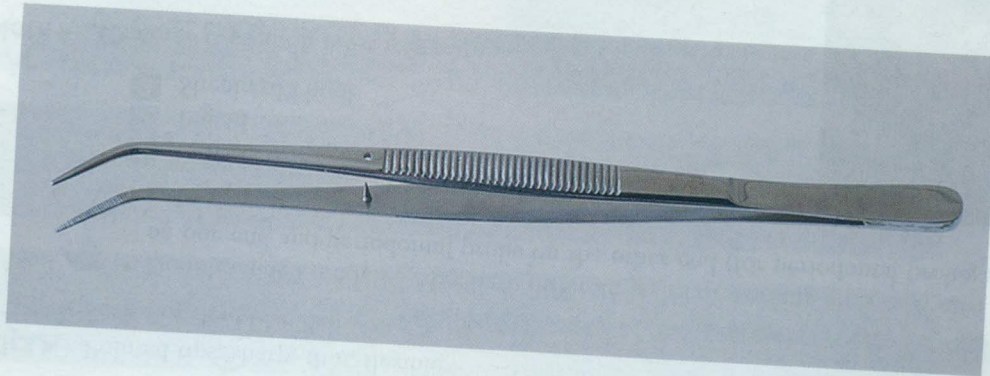
Variety of sizes and types:

- 1 Orban
- 2 Pigtail
- 3 Shepherd's hook

Practice Note ▶ Explorer is used on most tray setups.

S Explorer must be cleaned, bagged individually or bagged/wrapped in a tray setup, and then sterilized. A chemical/steam indicator device should be included in the wrapping.





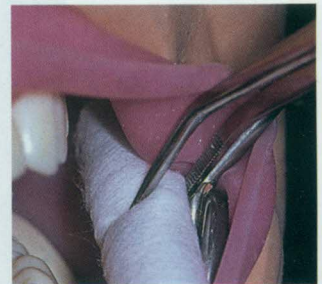
■ INSTRUMENT

Cotton Forceps (Pliers)

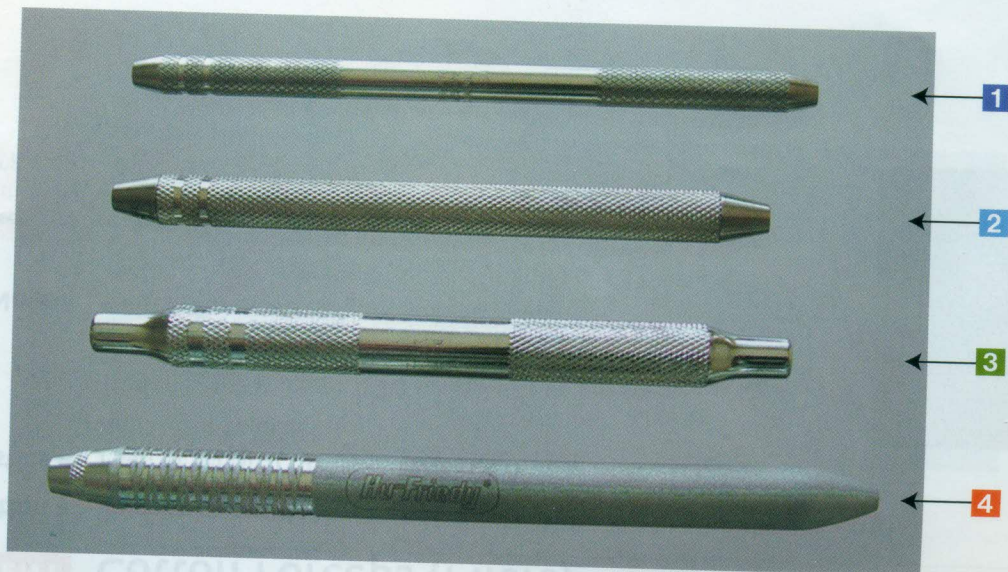
Function ▶ To grasp or transfer items and/or material into and out of the oral cavity

Characteristics ▶ Plain or serrated tips
Pointed or rounded tips
Locking forceps (see Chapter 11)
Range of sizes available

Practice Note ▶ Cotton Forceps is used on most tray setups.



S Cotton Forceps must be cleaned, bagged individually or bagged/wrapped in a tray setup, and then sterilized. A chemical/steam indicator device should be included in the wrapping.



■ INSTRUMENT

Instrument Handles

Function ▶ To hold (grasp) instrument

Characteristics ▶ Single or double ended

Removable working ends (replaceable and interchangeable)

Examples: Mouth mirror, scaler

Nonremovable working ends also available (commonly used)

Larger diameter models—Help lighten grasp and maximize control

Alternating diameter models—Lessen stress associated with carpal tunnel syndrome

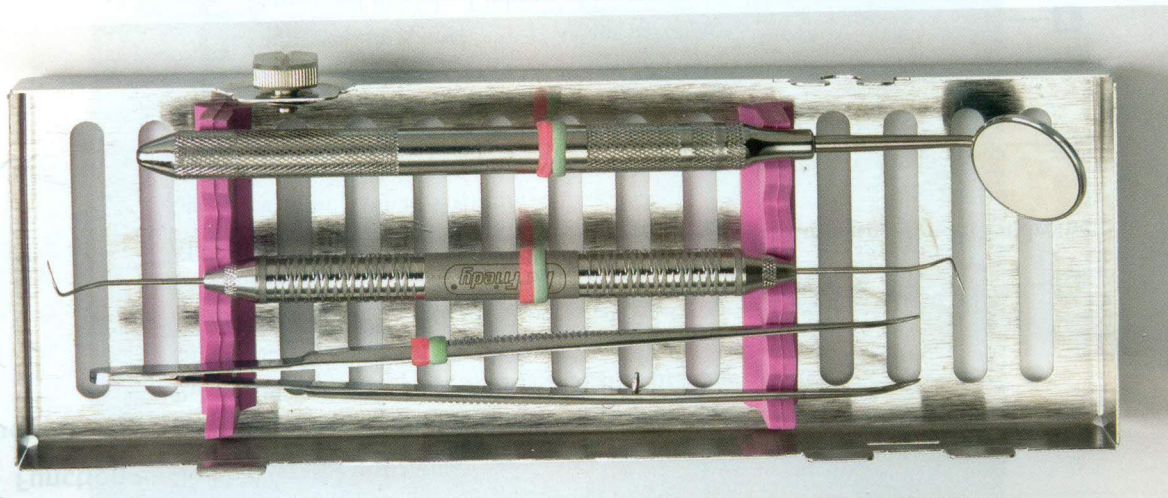
Lighter weight models—Minimize fatigue

Variety of sizes, styles, and textures:

- 1 Small, round $\frac{1}{4}$ -inch stainless steel
- 2 Standard, hollow $\frac{5}{16}$ -inch stainless steel
- 3 Lightweight, $\frac{3}{8}$ -inch slip-resistant pattern
- 4 Satin Steel model—Lightweight, ergonomically designed



When working end is attached to the handle, the instrument must be cleaned, bagged individually or bagged/wrapped in a tray setup, and then sterilized. A chemical/steam indicator device should be included in the wrapping.



■ TRAY SETUP

Basic

From Top to Bottom ▶

Mouth Mirror, Pigtail Explorer, Cotton Forceps (example of color-coded instruments in a cassette)

Practice Note ▶

Basic setup is found on most all dental tray setups.

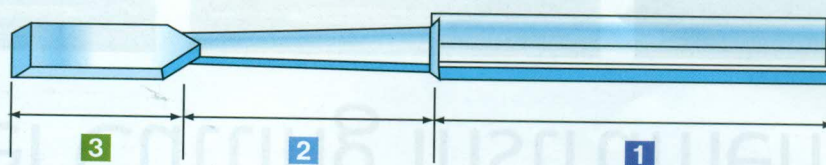
S

Basic Setup Instruments must be cleaned, bagged as a tray setup or in a cassette (as shown in picture), and then sterilized. A chemical/steam indicator device should be included in the wrapping.

2

Enamel Cutting Instruments



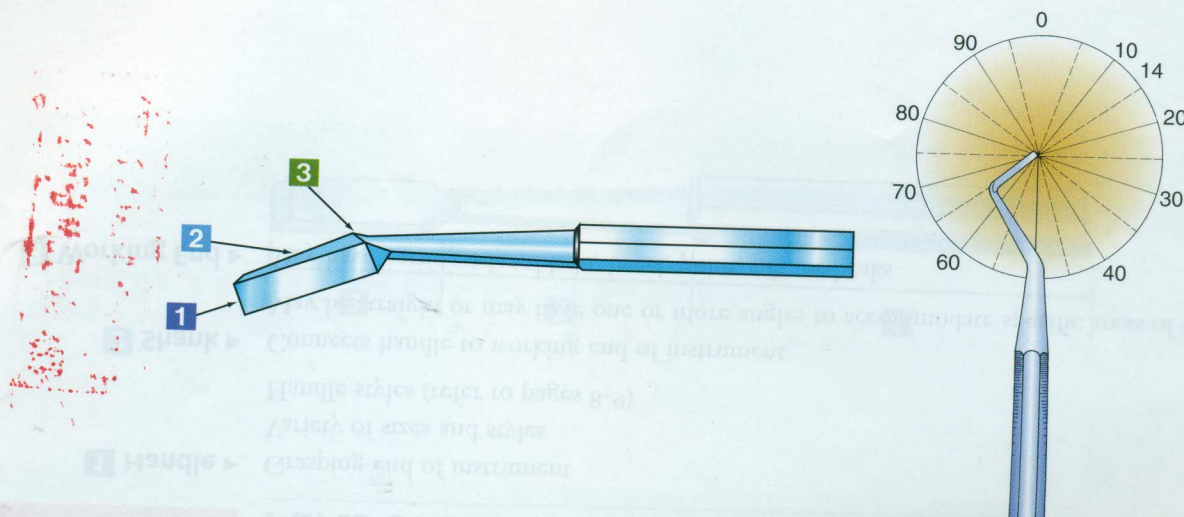


Parts of an Instrument

- 1 Handle ▶** Grasping end of instrument
Variety of sizes and styles
Handle styles (refer to pages 8-9)
- 2 Shank ▶** Connects handle to working end of instrument
May be straight or may have one or more angles to accommodate specific areas of the mouth
- 3 Working End ▶** May have cutting edge, blade, bevel, point, nib, or beaks

Example of instrument designation: 200-12
Example of over-numbered instrument: Enamel Hatcher Channel 200-12

*The instrument number formula was designed by Dr. G.V. Black, Northwestern University



INSTRUMENT

Three-Number Instrument*

Function ► Numbers on handle indicate width, length, and angle of blade

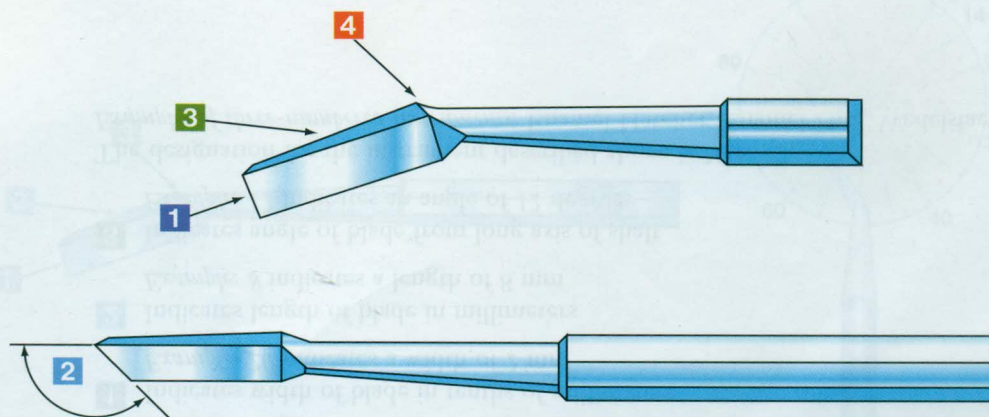
- 1** Indicates width of blade in tenths of millimeters
Example: 20 indicates a width of 2 mm
- 2** Indicates length of blade in millimeters
Example: 8 indicates a length of 8 mm
- 3** Indicates angle of blade from long axis of shaft
Example: 12 indicates an angle of 12 degrees

The designation for the instrument described above is 20-8-12.

Examples of three-numbered instruments: Enamel Hatchet, Enamel Hoe, Wedelstaedt



*The instrument number formula was designed by Dr. G.V. Black, Northwestern University.



INSTRUMENT

Four-Number Instrument*

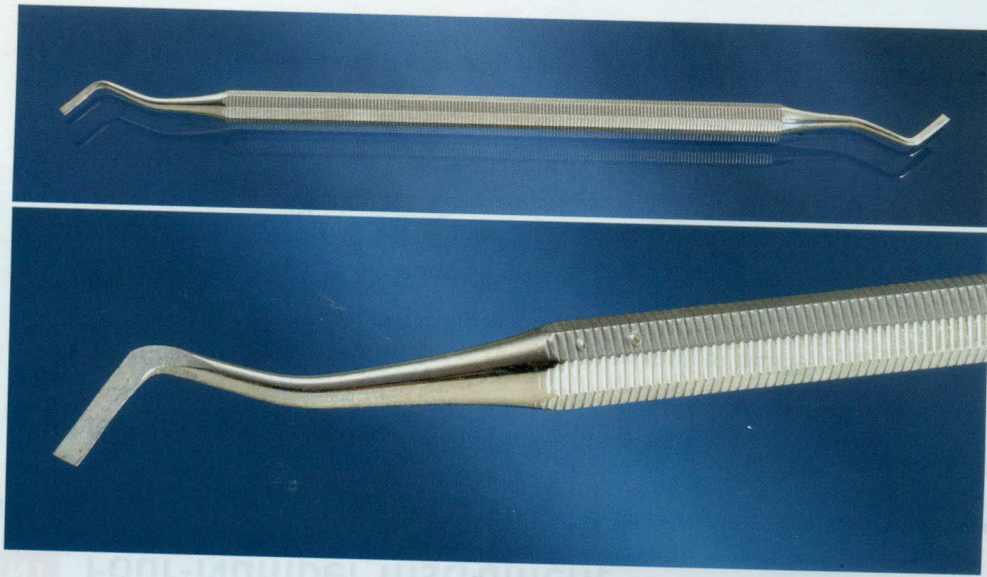
Function ▶ Numbers on handle indicate width of blade, angle of cutting edge, length of blade, and angle of blade

- 1** Indicates width of blade in tenths of millimeters
Example: 20 indicates a width of 2 mm
- 2** Indicates angle of cutting edge of blade in relation to handle
Example: 95 indicates a cutting edge angle of 95 degrees
- 3** Indicates length of blade in millimeters
Example: 8 indicates a length of 8 mm
- 4** Indicates angle of blade from long axis of shaft
Example: 12 indicates a blade angle of 12 degrees

The designation for the instrument described above is 20-95-8-12.

Examples of four-numbered instruments: Angle Former, Gingival Margin Trimmers—Mesial and Distal

*The instrument number formula was designed by Dr. G.V. Black, Northwestern University.



■ INSTRUMENT Enamel Hatchet

Functions ▶ To clean and smooth walls in cavity preparation
To remove enamel not supported by dentin

Characteristics ▶ Used with push motion
Cutting edge on same plane as handle
Single or double ended

Is a three-numbered instrument

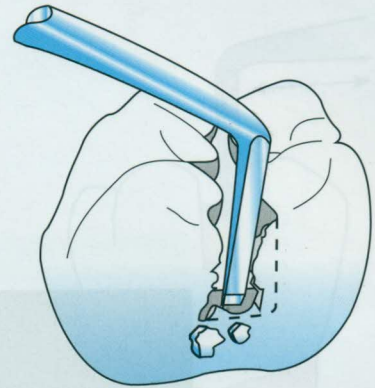
Examples of instrument numbers:

20-9-14

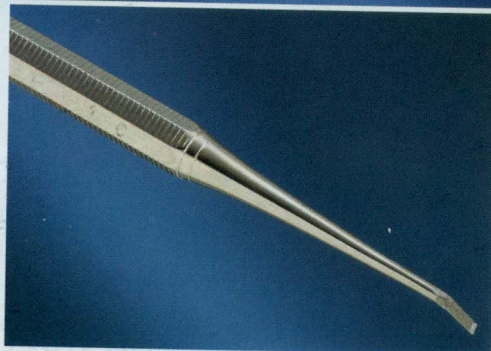
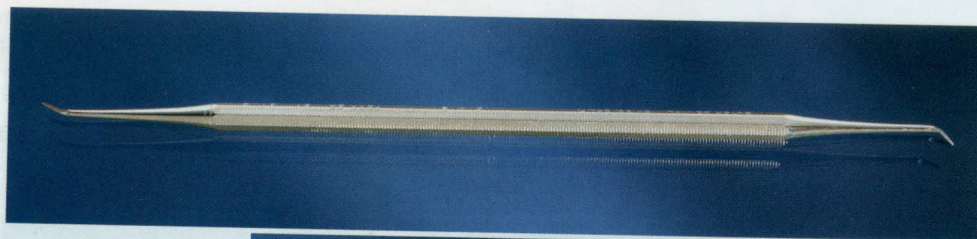
15-8-14

15-8-12

Practice Note ▶ Enamel Hatchet is used on restorative tray setups.



S Enamel Hatchet must be cleaned, bagged individually or bagged/wrapped in a tray setup, and then sterilized. A chemical/steam indicator device should be included in the wrapping.



■ INSTRUMENT Enamel Hoe

Function ▶ To clean and smooth floor and walls in cavity preparation

Characteristics ▶ Used with pulling motion
Cutting edge or blade nearly perpendicular to handle
Is a three-numbered instrument

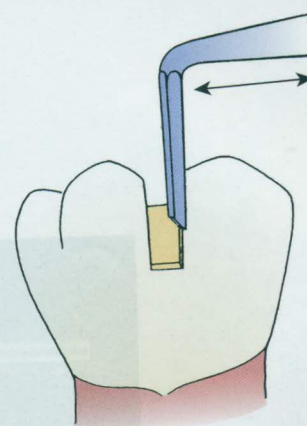
Examples of instrument numbers:

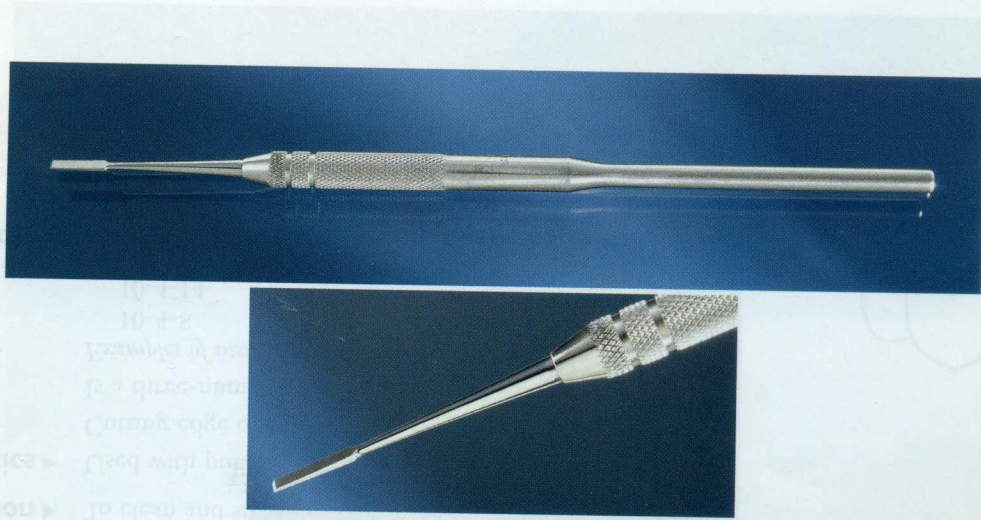
10-4-8

10-4-14

Practice Note ▶ Enamel Hoe is used on restorative tray setups.

S Enamel Hoe must be cleaned, bagged individually or bagged/wrapped in a tray setup, and then sterilized. A chemical/steam indicator device should be included in the wrapping.





■ INSTRUMENT

Straight Chisel

Function ▶ To plane and cleave enamel in cavity preparation

Characteristics ▶ Used with push motion
Single-bevel cutting edge
Single or double ended

Examples of instrument numbers:

15

20

Practice Note ▶ Straight Chisel is used on restorative tray setups.



Straight Chisel must be cleaned, bagged individually or bagged/wrapped in a tray setup, and then sterilized. A chemical/steam indicator device should be included in the wrapping.



■ INSTRUMENT Wedelstaedt Chisel

Function ► To plane and cleave enamel in cavity preparation

Characteristics ► Used with push motion
Curved blade
Single-bevel cutting edge
Single or double ended
Is a three-numbered instrument

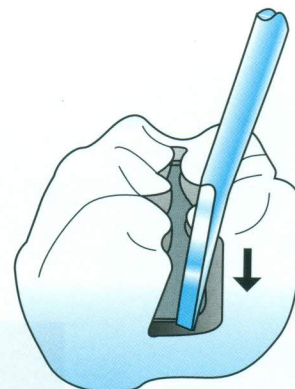
Examples of instrument numbers:

15-15-3

11.5-15-3

Practice Note ► Wedelstaedt Chisel is used on restorative tray setups.

Wedelstaedt Chisel must be cleaned, bagged individually or bagged/wrapped in a tray then sterilized. A chemical/steam indicator device should be included in





■ INSTRUMENT

Binangle Chisel

Function ► To plane and cleave enamel in cavity preparation

Characteristics ► Used with push motion
Two angles in the shank
Single or double ended
Is an example of three-numbered instrument

Examples of instrument numbers:

20-9-8

15-8-8

Practice Note ► Binangle Chisel is used on restorative tray setups.

Binangle Chisel must be cleaned, bagged individually or bagged/wrapped in a tray and then sterilized. A chemical/steam indicator device should be included in the tray.

