

The Glossary of Prosthodontic Terms

Ninth Edition

GPT-9

The Academy of Prosthodontics

The Academy of Prosthodontics Foundation

Editorial Staff

Glossary of Prosthodontic Terms Committee of the Academy of Prosthodontics

Keith J. Ferro, *Editor and Chairman, Glossary of Prosthodontic Terms Committee*

Steven M. Morgano, *Copy Editor*

Carl F. Driscoll, Martin A. Freilich, Albert D. Guckes, Kent L. Knoernschild and Thomas J. McGarry, *Members, Glossary of Prosthodontic Terms Committee*

Cover photo

Heat by Naoki Aiba, CDT.

© Naoki Aiba Photography.

Preface to the Ninth Edition

“The difference between the right word and the almost right word is the difference between lightning and a lightning bug.”

—Mark Twain

I live down the street from Samuel Clemens’ (*aka* Mark Twain) home in Hartford, Connecticut. I refer to his quotation because he is a notable author who wrote with familiarity about our spoken language. Sometimes these spoken words are objectionable and more appropriate words have evolved over time. The editors of the ninth edition of the *Glossary of Prosthodontic Terms* ensured that the spoken vernacular is represented, although it may be

nonstandard in formal circumstances. I hope that authors, poster presenters, and lecturers will use this edition as a guide for the “right word”.

This ninth edition of the *Glossary of Prosthodontic Terms* upholds the same objectives and standards as it did when it was first authored by the Academy of Denture Prosthetics in 1956. Throughout the world of prosthodontics, it has been valued as a reference for “uniform terminology [that] would permit authors to discuss their concepts and techniques and be sure that these would be understood by those who would read the articles, regardless of the geographic location or the specialty of the reader.”¹ The generation of new terms and the modification of the old definitions, significant as much today as they were a century ago, are a resounding hallmark in the collective advancements of new knowledge in our specialty.

The Fellows of the Academy of Prosthodontics, with the leadership of the Glossary of Prosthodontic Terms Committee, have strived to faithfully execute the duties of lexicographers. It holds true throughout these several decades that we should continue the improvement of this document with contributions by many prosthodontic organizations regardless of geographic location or political affiliations. Acknowledgments are recognized by many of the Academy fellowship, too many to name individually, with whom we have consulted for expert opinion. Also recognized are Gary Goldstein, Charles Goodacre, Albert Guckes, Steven Morgano, Stephen Rosenstiel, Clifford VanBlarcom, and Jonathan Wiens for their contributions to the *Glossary*, which have spanned many decades. We thank them for guiding us in this monumental project and teaching us the objectiveness and the standards for evidence-based dentistry to be passed on to the next generation of dentists.

Keith J. Ferro, DMD

Committee Chairman, Committee of the Glossary of Prosthodontic Terms, Edition Nine
Academy of Prosthodontics

¹Glossary of Prosthodontic Terms, Edition One, J Prosthet Dent 1956;1-34

Preface to the First Edition

This *Glossary* is a collection of words and terms and their special connotations in the art and science of prosthodontics. It is in the nature of a progress report in a tremendous effort to standardize the nomenclature used in this field. The advantages to the dental profession of a successful effort in this direction are manifold. The most important of these is that the use of a uniform terminology would permit authors to discuss their concepts and techniques and be sure that these would be understood by those who would read the articles, regardless of the geographic location or the specialty of the reader.

The need for a glossary of terms used in prosthodontics has been recognized for many years. In 1923, Ottofy stated, “It is to be hoped that members of the profession and specialists through their organizations will reach an agreement as to the terms to be given preference or to be used exclusively.” He called particular notice to the confused state of the prosthodontic terminology of that time, and it is even worse now because of the progress in the art and science of prosthodontics. Many new terms and words intended to describe or explain modern philosophies or procedures have been added to the literature. Authors, clinicians, and teachers have ascribed many different interpretations and meanings to the same terms and words. Many “old” terms have been given “new” definitions by contemporary authors. Many “old” terms have been redefined in the light of the increased knowledge of the problems of prosthodontics.

Through the years, individuals, specialty groups, and the Bureau of Library and Indexing of the American Dental Association have made many sincere attempts to develop a standard and

acceptable nomenclature in dentistry. The major obstacle has been the difficulty in obtaining universal acceptance of proposed interpretations.

The Academy of Denture Prosthetics has studied the problem throughout its existence and, until recently, has reached unanimous agreement on very few terms. This was in spite of sincere and valiant efforts on the part of the nomenclature committees, and it was due to the wide differences of opinion and background among those who considered the committees' recommendations. This lack of progress was most discouraging, but three years ago it was agreed by the Fellowship of the Academy that this Glossary would be prepared, and that the majority opinion would be adopted. This decision made possible real progress toward the ultimate goal—a universal terminology for prosthodontics.

The “workshop” technique was used in the course of two meetings of the Academy for the study of nearly 1000 words or terms. The Nomenclature Committee of the Academy restudied the results of these “workshop” sessions. At least sixteen outstanding prosthodontists have given serious study to each term included in this Glossary. The definitions represent a composite of their understanding of the terms. The Fellows of the Academy of Denture Prosthetics have combined their efforts to serve as lexicographers.

The chief role of a lexicographer is to record the current usage of words. The chief function of words in science is to convey meaning.

The lexicographer has a duty to lead as well as to follow. Where clearness demands it, he should place such restrictions as are necessary to avoid ambiguity. That is, he must narrow down some definitions so they will not carry too much generality. Where voids exist, he should fill them in. Where more than one term is used to express the same idea or concept, he should indicate the preference on the basis of logic and other considerations.

Many instances could be cited in the Glossary where the Academy and its Nomenclature Committee have performed these various “duties” of the lexicographer. Certain terms were determined to be objectionable for some reason and are marked (*Obj*).¹ Some new terms have been added which seem to express the desired idea or meanings more accurately than the corresponding terms in current usage. Where more than one term which carries the same connotation was found, the preferred term is listed first. Likewise, when more than one definition was assigned to the same term, the preferred definition is listed first. These decisions were made on the basis of majority opinion. It is hoped that eventually obsolete or objectionable terms and terms which tend to mislead and confuse will be eliminated entirely.

This, the first edition of the Glossary, is offered to the dental profession for its consideration. Since it is recognized that there are some terms that have not been included and that some other terms and definitions that may be objectionable to some authorities have been included, revisions will be necessary from time to time. Constructive suggestions are invited, and these will be given thorough consideration in future editions. In its present form, this Glossary can serve as a good temporary standard.

It is impossible to give due credit here to all that have worked to make this Glossary possible. The Fellows of the Academy of Denture Prosthetics have supplied the fundamental information and have made the necessary decisions. The Editorial Council of THE JOURNAL OF PROSTHETIC DENTISTRY, and The C. V. Mosby Company, its publisher, have provided encouragement and technical assistance in its development. Special acknowledgment is due to Dr George B. Denton of the Bureau of Library and Indexing of the American Dental Association, for his advice and counsel, and to Mrs. Marice K. Musgrove and Miss Barbara Eichhorn for the tremendous amount of secretarial work which was necessary. Acknowledgment is made, also, to certain dictionaries and textbooks from which the definitions for some of the terms have been

taken. These are: Dorland, W. A. Newman, The American Illustrated Medical Dictionary, ed. 22, Philadelphia, 1951, W. B. Saunders Company (Dor.); Dunning, William B., and Davenport, S. Ellsworth, Jr., A Dictionary of Dental Science and Art, Philadelphia, 1936, P. Blakiston's Son & Company, Inc. (D. & D.); Swenson, Merrill G., and Terkla, Louis G., Partial Dentures, St. Louis, 1955, The C. V. Mosby Company (S.); Blakiston's New Gould Medical Dictionary, ed. 1, Philadelphia, 1949, The Blakiston Company (Gould). To all of these, the Nomenclature Committee expresses its gratitude.

THE NOMENCLATURE COMMITTEE

ACADEMY OF DENTURE PROSTHETICS

¹The recent edition designates an objectionable (*obj* in previous editions) term as *slang* and *nonstandard*.

Contributions to the Ninth Edition of the Glossary of Prosthodontic Terms were requested from the following organizations:

The Academy of Prosthodontics
The American Academy of Esthetic Dentistry
The American Academy of Fixed Prosthodontics
The American Academy of Implant Dentistry
The American Academy of Maxillofacial Prosthetics
The American Academy of Restorative Dentistry
The American Board of Prosthodontics
The American College of Prosthodontists
The American Dental Education Association
The American Equilibration Society
The American Prosthodontic Society
The Association of Prosthodontists of Canada
The Australian Prosthodontic Society
The British Society for the Study of Prosthetic Dentistry
The Greater New York Academy of Prosthodontics
The Indian Prosthodontic Society
The International Academy of Gnathology-American Section
The International Journal of Prosthodontics
The Iranian Prosthodontic Journal
The Italian Academy of Prosthetic Dentistry
The Journal of Prosthetic Dentistry
The Journal of Prosthodontics

The Korean Academy of Prosthodontics
The Northeastern Gnathological Society
The Pacific Coast Society for Prosthodontics
The Swiss Society of Reconstructive Dentistry
The Turkish Prosthodontics and Implantology Association

Explanatory Notes

Entries

Main entries

Any **boldface** letter or combination of letters that is set flush with the left-hand margin of each page constitutes a main entry or main-entry word. Such main entries may consist of letters, letters joined by hyphens, or letters separated by one or more spaces:

glare ... *vb*

glass-ceramics ... *n*

gold foil ... *n*

The subsequent explanation in lightface type that follows each main entry on the same line and, as necessary, on succeeding indented lines explains its inclusion in the glossary. Variations in compound words are frequent and widespread. Generally, although several acceptable variations may occur, one single style for any compound word has been chosen, usually on the basis of its frequency of occurrence, because that usually is its predominant form.

Order of main entries

All main entries are listed in their alphabetic order, letter by letter, without regard to intervening spaces or hyphens; that is, **iatrogenic** follows **I-bar clasp**. Generally accepted abbreviations have been spelled out in the alphabetic order. Full words come before parts of words made with the same letters.

Homographs

Some main entries have precisely the same written form. Two or more similarly spelled words are distinguished by superscript numerals that precede each word:

¹ **lute** ... *n* ¹ **articulate** ... *vb*

² **lute** ... *vt* ² **articulate** ... *adj*

Homographs are generally entered in order of their first use in the English language.

Guide words

Pairs of words, termed *guide words*, are printed at the top of each page. All main entries that fall alphabetically between the guide words are found on that page. The first guide word is alphabetically the first entry on the page, and the second guide word is the last entry:

agenesis • alveolar resorption

Variants

If a main entry is followed by another variation of the word with another spelling, the two spellings are equal variants. Both may be assumed to be standard, and either one may be used according to personal inclination:

color or colour

Run-on entries

A main entry may be followed by one or more derivatives or by a homograph with a different functional label. These constitute run-on entries. Each is introduced by a lightface dash and each has a functional label. They are, however, not defined because their meanings are readily derived from the root word's meaning:

²**curve** ... *vb* ... **-curved** ... **-curving** ... *vi*

Functional Labels

An *italic* label indicating a part of speech or some other functional classification follows the main entry. The eight standard parts of speech are:

adjective ... *adj*

adverb ... *adv*

conjunction ... *conj*

interjection ... *interj*

noun ... *n*

preposition ... *prep*

pronoun ... *pron*

verb ... *vb*

If a verb is *transitive* and *intransitive*, the functional labels *vt* and *vi* introduce the subdivisions. Other italicized labels used to indicate functional classifications that are not traditional parts of speech are:

-prefix

-suffix

-trademark

Capitalization

Most main entries in this glossary begin with a lowercase letter. Some, however, begin with an uppercase letter, which indicates that the word is usually capitalized:

myocentric

Myo-monitor

The capitalization of entries that are open or hyphenated compounds is indicated by the form of the entry:

Dolder bar ...

curve of Spee ...

Davis crown ...

GPT terms related to the main entry are capitalized and placed after the definition. Non-GPT related terms are in lowercase, italicized, and placed after the definition.

Etymology

All material in square brackets preceding the definition constitutes the etymology. Etymology traces a vocabulary entry as far back as possible in English, and, where possible, its origins.

Dates

Some main entries will have a date enclosed in parentheses immediately preceding the boldface colon that introduces the first sense or sense number when one is present. This represents the date of earliest recorded use, in English, as far as could be determined. Many prosthodontic terms have evolved without prior dating. As such, few dates appear in this glossary.

Usage

Usage notes

Only one status label (temporal) is used in this glossary to denote that a word, the sense of a word, or a phrase is not part of the standard vocabulary of prosthodontics. The label *obs* for “obsolete” means that there is no evidence to support its use in current literature:

balancing side ... *obs* ... *syn*, NONWORKING-SIDE

The label *obs* is a comment by the editorial staff on the word being defined. An appropriate definition is provided where no current term is available or, alternatively, current acceptable terminology is suggested.

The stylistic label *slang* is used with words or senses that are especially inappropriate or in contexts of extreme informality. There is no satisfactory objective test for slang. Many are composed of shortened forms or extravagant or fictitious figures of speech:

bite registration ... *n* ... *slang* ... *syn*, MAXILLOMANDIBULAR RELATIONSHIP RECORD

suck-down ... *n* ... *slang* ... *syn*, VACUUM THERMOMOLD

The stylistic label *nonstand* for “nonstandard” is used for words or senses that conform to a widespread pattern of usage in informality that differs in choice of word or expression from that of the general prosthodontic community language standard. In fact, many words, invariably nonstandard, are in our spoken vernacular:

black triangle ... *nonstand* ... *syn*, INTERDENTAL GINGIVAL SPACE

pink porcelain ... *nonstand* ... *syn*, GINGIVAL PORCELAIN

Usage paragraphs

Brief usage notes or paragraphs, labeled *Editorial note for usage*, have been placed in several entries for words or phrases that are considered to present special problems in terms of confused or disputed usage. A usage paragraph typically summarizes the historic background of the issue and its associated body of opinion, compares these with available evidence of current usage, and often adds comment for the use of the inquirer.

Definitions

Division of senses

A boldface colon is used in this glossary to introduce a definition:

¹**abrasive** *n* (1853): a substance used for abrading, smoothing, or polishing

Boldface Arabic numerals separate the senses of a word that has more than one sense:

equilibrium *n* (1608): **1.** a state of even adjustment between opposing forces; **2.** the state or condition of a body in which any forces acting upon it are so arranged that their product at every point is zero; **3.** a balance between active forces and negative resistance

The system of separating the various senses of a word by numerals is strictly a lexical convenience. It tends to reflect something of the semantic relationship, but it may establish a hierarchy of importance within them. Sometimes a particular relationship between senses is suggested by use of an italicized sense divider: *comp* (for *compare*). A brief statement that discriminates words of closely associated meaning has been placed in some entries. They are signaled by an *italic: syn* (for *synonym*). Italicized sense dividers are followed by the all CAPITALIZED glossary term or an *italicized* term if it is not in the glossary. With respect to the hierarchy of the use of a term, the primary term is defined.

Omission of a sense

Occasionally the glossary user, having turned to an entry, may not find an expected or hoped for particular sense. This usually means that the editors judged the sense insufficiently common or otherwise unimportant to include in the glossary. Because our language is dynamic, revision by future editors may reflect changes in the sense of a word not found in this edition.

Abbreviations Used in This Work

abbr ... abbreviation

adj ... adjective

adv ... adverb

c ... century

ca ... circa

contr ... contraction

comp ... compare

GPT-1 ... Glossary of Prosthodontic Terms, Edition 1, J Prosthet Dent 1956 (March); Appendix No. 2 inserted supplemental between 1:286 and 1:287

GPT-2 ... Glossary of Prosthodontic Terms, Edition 2, J Prosthet Dent 1960;10(6); Part Two, inserted supplemental after page 1200 of volume 10

GPT-3 ... Glossary of Prosthodontic Terms, Edition 3, J Prosthet Dent 1968;20:443-80

GPT-4 ... Glossary of Prosthodontic Terms, Edition 4, J Prosthet Dent 1977;38:66-109

GPT-5 ... Glossary of Prosthodontic Terms, Edition 5, J Prosthet Dent 1987;58:713-62

GPT-6 ... Glossary of Prosthodontic Terms, Edition 6, J Prosthet Dent 1994;71:41-111

GPT-7 ... Glossary of Prosthodontic Terms, Edition 7, J Prosthet Dent 1999;81:41-110

GPT-8 ... Glossary of Prosthodontic Terms, Edition 8, J Prosthet Dent 2005;94:1-92

n ... noun

nonstand ... nonstandard or informal

obs ... obsolete

orig ... original, originally

pl ... plural

pron ... pronoun

slang ... inappropriate

syn ... synonym

vb ... verb

vi ... verb intransitive

vt ... verb transitive

Pronunciation key

Spellings

gag

face

spar

bone

chew

deep, milled

peg

see, field

form, photon

gag

hard

whiting

pin

fine, by

veneer

jig

key, cone

metal, lug

mandible

nasal, pain

polishing

pontic

open

pawl

foil

took, neurogenous

lute, boot, rouge

out

papilla

rod

Pronunciation Key used in the Glossary

ă

ā

ä

b

ch

d

ě

ē

f

g

h

hw

ĩ

ī

îr

j

k

l

m

n

ng

ň

ō

ô

oi

őő

ōō

ou

p

r

sluice	s
shell	sh
template, stopped	t
thermal	th
this	<i>th</i>
cuff	ũ
firm, word, cervical	ûr
value	v
wire	w
yield	y
zero, xenogenic	z
occlusion	Zh

Standard References

Color

Agoston GA. Color theory and its applications in art and design. 2nd ed. Heidelberg: Springer Verlag, 1987.

Kelly KL, Judd DB. Color: universal language and dictionary of names. Washington, DC: U.S. Department of Commerce, National Bureau of Standards, December 1976. Spec. publication no. 440.

Nassan K. The physics and chemistry of color: the fifteen causes of color. New York: John Wiley and Sons, 1983.

MacAdam DL. Color measurement: theme and variations. 2nd ed. Heidelberg: SpringerVerlag, 1985.

Billmeyer FW Jr, Saltzman M. Principles of color technology. New York: John Wiley and Sons, 1981.

Wyazeki G, Stiles WA. Color science: concepts and methods, quantitative data and formulae. 2nd ed. New York: John Wiley and Sons, 1982.

Hunt RWG. Measuring colour. Chichester: John Wiley and Sons, 1987.

Hunter RS, Harold RW. The measurement of appearance. 2nd ed. New York: John Wiley and Sons, 1987.

Complete denture prosthodontics

Goddard PB. The anatomy, physiology and pathology of the human teeth: with the most approved methods of treatment; including operations, and the method of making and setting artificial teeth. With thirty plates. Philadelphia: Carey & Hart, 1844.

Harbert SC. A practical treatise on the operations of surgical and mechanical dentistry. Philadelphia: Barrett & Jones, 1847.

Tomes J. Instruction in the use and management of artificial teeth. Middlesex: Private printing, 1851.

Delabarre AFA. De la gutta percha et de son application aux dentures artificiales en remplacement des plaques metalliques et des substances osseuses corruptibles. Paris: V. Masson, 1852.

Richardson J. A practical treatise on mechanical dentistry. Philadelphia: Lindsay and Blakiston, 1860.

Wildman, E. Instructions in the manipulation of hard rubber, or vulcanite. Philadelphia: SS White Dental Manufacturing Co., 1865.

Evans TW. On the discovery of vulcanized caoutchouc: and the property of its application to dental purposes. Private printing, 1867.

Celluloid Manufacturing Co. Celluloid as a base for artificial teeth: instructions for manipulating the celluloid base, with testimonials from parties using it, and other information. Celluloid Manufacturing Co., 1878.

Maloney JA, Brightwell OH. The Goodyear Dental Vulcanite Co., O.H. Brightwell. Washington: Gibson Publishing Co., 1878.

Balkwill FH. Mechanical dentistry in gold and vulcanite. London: Churchill and Co., 1880.

White JW. The teeth: natural and artificial. Philadelphia: SS White Dental Manufacturing Co., 1880.

Sheffield LT. A new system of prosthetic dentistry. New York: Private printing, 1884.

Land, CH. The scientific adaptation of artificial dentures. Philadelphia: Private printing, 1885.

Andrieu E. Traite de prothese buccale et de mecanique dentaire. Paris: D. Doin, 1887.

White JW. Taking impressions of the mouth. Philadelphia: SS White Dental Manufacturing Co., 1891.

Gartrell JH. Continuous gum work: a description of new apparatus and methods for manipulating continuous gum and porcelain crowns. London: Dental Engineering Co., 1896.

Samsioe CA. A treatise on plateless dentures. Private printing, 1898.

Clapp GW. Mechanical side of anatomical articulation. New York: The Dental Digest, 1910.

Greene JW. Greene brothers' clinical course in dental prosthesis in three printed lectures. New and advanced test methods in impressions, articulation, occlusion, roofless dentures, refits and renewals. Chillicothe, MO: Private press, 1910.

Haskell LP. Harkell's manual of plate work or handbook for the dental laboratory. Chicago: Private press, 1910.

Clapp GW. Prosthetic articulation. New York: The Dentists' Supply Co., 1914.

- Girdwood J. Tube teeth and porcelain rods. Private printing, 1914.
- Wilson GH. Dental prosthetics. 2nd ed. Philadelphia: Lea & Fabiger, 1914.
- The Dentists' Supply Co. Trubyte teeth for vulcanite plates: as designed by J. Leon Williams and Alfred Gysi together with a formulation of the law of harmony between faces and teeth and a description of the Trubyte system of classifying face forms. New York: The Dentists' Supply Co., 1917.
- Liberthal RH. Advanced impression taking. Scientific and correct method based upon principles founded by Drs. Greene. New York: Professional Publishing Co., 1918.
- Clapp GW, Tench RW. Professional denture service. New York: The Dentists' Supply Co., 1918.
- Leger Derez H. Traite de prothese dentaire. Paris: C. Ash and Sons Co., 1920.
- Wilson GH. A manual of dental prosthetics. 2nd ed. Philadelphia: Lea & Febiger, 1920.
- Clapp GW, Tench RW. Professional denture service. Vol. 2. New York: The Dentists' Supply Co., 1921.
- The Dentists' Supply Co. Principles of selection and articulation. New York: The Dentists' Supply Co., 1921.
- Cummer WE. The Rupert Hall method for entire upper and lower dentures. Bulletin no. 2, Hamilton, Ontario, Canadian Dental Research Foundation, 1921.
- Gabell DP. Prosthetic dentistry. A textbook on the chairside work for producing plate dentures. London: H. Froude; Hodder & Stoughton, 1921.
- Rupp FW. The mathematics of dental prosthetics, showing the necessity for the use of various other instruments of precision in order to obtain satisfactory dentures from the use of anatomical articulators of any brand. London: J. Bale Sons & Danielsson, 1921.
- Berthold AHR. Engineering applied to dentistry. Modern retention of artificial dentures from an engineering standpoint. Chicago: International Dental Manufacturing Co., 1922.
- Ash C. Ash's all porcelain teeth: dowel crowns and non platinum tube teeth for vulcanite dentures and for all classes of crown and bridge work. London: Ash, Julius, 1923.
- Campbell DD. Full denture prosthesis. St. Louis: The C V Mosby Co., 1924.
- Goodhugh T. The art of prosthetic dentistry, London: Bailliere, 1924.
- Hanau RH. Full denture prosthesis. Intraoral technique for Hanau Articulator model H. Buffalo: (Dental engineering), 1926.
- Hanua RH. Hanau intraoral method vs Gysi extraoral method. Buffalo: Private press, 1927.
- Gysi A. Practical conclusions from scientific research in denture construction. New York: Dentists' Supply Co., 1929.
- Sears VH. Full denture procedure. New York: Macmillan Co., 1929.
- Bunce EW. The Bunce Kanouse full denture technic. Chicago: Coe Laboratories, Inc., 1929.
- Sears VH. Full denture procedure. New York: Macmillan Co., 1929.
- Nichols IG. Prosthetic dentistry, an encyclopedia of full and partial denture prosthesis. St. Louis: The C V Mosby Co., 1930.
- Swenson MG. Outline of full denture prosthesis. New York: University Press, 1932.

- Fish EW. Principles of full denture prosthesis. London: John Bale Sons and Danielsson Ltd., 1933.
- Lott FM. The problem of facsimile reproduction of anterior esthetics in full denture prosthesis. Bulletin no. 17. Toronto: Canadian Dental Research Foundation, 1933.
- Frahm FW. The principles and technics of full denture construction. Brooklyn: Dental Items of Interest Publishing Co., 1934.
- Williams JL. Trubyte teeth for denture restorations. New York: Dentists' Supply Co., 1935.
- Lott FM. Glass as a denture base. Bulletin no. 23. Toronto: Canadian Dental Research Foundation, 1936.
- Sears VH. Prosthetic papers. Minneapolis: Private press, 1936.
- Doxtater LW. Full and partial denture prosthesis. Brooklyn: Dental Items of Interest Publishing Co., 1936.
- Sears VH. Prosthetic papers. Minneapolis: Dental Library, Bureau of Engraving, Inc., 1936.
- Essig NS. Prosthetic dentistry. Brooklyn: Dental Items of Interest Publishing Co., 1937.
- House MM. Full denture technique. Whittier, CA: Private printing, 1937.
- House MM, Loop JL. Form and color harmony in the dental art. Whittier, CA: Private printing, 1939.
- Schlosser RO. Complete denture prosthesis. Philadelphia: W B Saunders Co., 1939.
- Swenson MG. Complete dentures. St. Louis: The C V Mosby Co., 1940.
- Neil E. The upper and the lower. A simplified full denture impression procedure. Chicago: The CAL Technical Library, 1941.
- Miller RG. Synopsis of full and partial dentures. St. Louis: The C V Mosby Co., 1942.
- Adams CW. Selection and articulation of artificial teeth. New York: Dentists' Supply Co., 1943.
- Hirsehorn H. Denture base readjustment. Baltimore: Williams and Wilkins Co., 1943.
- Hunter C, Samson E. Mechanical dentistry; a practical treatise on the construction of the various kinds of artificial dentures. London: The Technical Press Ltd., 1945.
- Schwartz MM. You can be happy with dental plates. Private printing, 1945.
- Tuckfield W. Full denture technique. 2nd ed. Melbourne: Australian College of Dentistry, 1945.
- Landa JS. Practical full denture prosthesis. Brooklyn: Dental Items of Interest Publishing Co., 1947.
- Hordes S. Full denture construction. Albany: University of the State of New York Press, 1949.
- Sears VH. New teeth for old. Salt Lake City: University of Utah Press, 1949.
- Sears VH. Principles and techniques for complete denture construction. St. Louis: The C V Mosby Co., 1949.
- Fenn HRB, Liddelow KP, Gimson AP. Clinical dental prosthetics. London: Staples Press, 1953.
- Landy C. Full dentures. St. Louis: The C V Mosby Co., 1958.

Crowns

Goslee HJ. Principles and practice of crown and bridgework. A practical, systematic modern treatise upon the requirements and technique of artificial crown work including some incidental reference to bridgework. 4th ed. New York: Consolidated Dental Manufacturing Co., 1903.

Land CH. Porcelain dental art. Private printing, 1904.

Chayes HES. The application of the Davis crown in prosthetic dentistry. New York: Private printing, 1912.

Lochhead Laboratories. The porcelain jacket crown. A treatise containing interesting and authentic information regarding the technique, preparation and field of application of porcelain jacket crowns in an everyday practice. New York: Private printing, 1918.

Thompson GA. Porcelain technic. Private printing, 1918.

Collett HA. Gold shell crowns and how to make them. The solution of problems in dental mechanics. New York: Private printing, 1922.

Ash C. Ash's all porcelain teeth: dowel crowns and non platinum tube teeth for vulcanite dentures and for all classes of crown and bridgework. London: Ash, Julius, 1923.

LeGro AL. Ceramics in dentistry. Brooklyn Dental Items of Interest Publishing Co., 1925.

Stern MN. Enameloid acrylics in dentistry. Forest Hills, NY: The Credo Publishing Co., 1942.

Engle F. Three quarter crowns; how to construct and apply them. Brooklyn: Dental Items of Interest Publishing Co., 1946.

Levy, IR. Acrylic inlays, crowns and bridges. Philadelphia: Lea & Febiger, 1950.

Brecker SC. The porcelain jacket crown. St. Louis: The C V Mosby Co., 1951.

Dental laboratory science

Haskell LP. The student's manual and handbook for the dental laboratory. Philadelphia: Welch Dental Co., 1887.

Chupein TF. The dental laboratory; a manual of gold and silver plate work for dental substitutes, crowns, etc. Philadelphia: Johnson & Lund, 1889.

Abonyi J. Compendium der Zahutechnik fur studirende und Krste. Stuttgart: F. Enke, 1892.

Chasman C. Manual of mechanical dentistry. Philadelphia: Private printing, 1932.

Schwartz JR. Practical prosthetic procedure. Philadelphia: Universal Dental Co., 1934.

Salzman JA. Manual for dental technicians. New York: Pitman Publishing Corp., 1938.

Chappelle WF. Partial denture technics. Buffalo: Williams Gold Refining Co., 1941.

Wells AS, Reynolds GW. Laboratory manual for crown and bridge technique. Ann Arbor: Edwards Brothers, Inc. Lithoprinters, 1944.

Boucher CO. Dental prosthetic laboratory manual. St. Louis: The C V Mosby Co., 1947.

Dental materials science

Flagg JF. Plastics and plastic fillings: as pertaining to the filling of all cavities of decay in teeth below medium in structure. Philadelphia: P. Blakiston, 1881.

- Essig CJ. Manual of dental metallurgy. Philadelphia: Lea Brothers and Co., 1882.
- Gilbert SE. Vulcanite and celluloid: instruction in their practical working for dental purposes. Philadelphia: SS White Dental Manufacturing Co., 1884.
- Warren GW. A manual of mechanical dentistry and metallurgy. Philadelphia: Private printing, 1905.
- Hughes CN. Questions and answers on prosthetic dentistry and metallurgy. St. Louis: The C V Mosby Co., 1914.
- Hepburn WB. Notes on dental metallurgy for the use of dental students and practitioners. 2nd ed. New York: W. Wood and Co., 1915.
- Capon WA. Porcelain dental restorations. Philadelphia: Lea & Febiger, 1920.
- Hovestad JF. Practical dental porcelains. St. Louis: The C V Mosby Co., 1924.
- LeGro AL. Ceramics in dentistry. Brooklyn: Dental Items of Interest Publishing Co., 1925.
- Ray KW. Metallurgy for dental students. Philadelphia: P. Blakiston's Son & Co., 1931.
- Felcher FR. The art of porcelain in dentistry. St. Louis: The C V Mosby Co., 1932.
- Skinner EW. The science of dental materials. Philadelphia: W B Saunders Co., 1936.
- Felcher FR. Porcelain in dentistry. St. Louis: The C V Mosby Co., 1932.
- Salzmann JA. Manual for dental technicians: vulcanite. New York: Private printing, 1938.
- Salzman JA. Manual for dental technicians: with a supplement on acrylics. 1938.
- Cohen M. Ceramics in dentistry. Philadelphia: Lea & Febiger, 1940.
- Stern MN. Enameloid acrylics in dentistry. Forest Hills, NY: The Credo Publishing Co., 1942.
- Orlowski HJ. Dental porcelain. Columbus: College of Engineering, Ohio State University Press, 1944.
- Osborne J. Acrylic resins in dentistry. Oxford: Blackwell, 1944.
- Tylman SD, Peyton FA. Acrylics and other synthetic resins used in dentistry. Philadelphia: J B Lippincott Co., 1946.
- Osborne J. Acrylic resins in dentistry. Springfield: C. C. Thomas Co., 1948.

Fixed partial denture prosthodontics

- Clifford IE, Clifford RE. Crown, bar and bridgework: new methods of permanently adjusting artificial teeth without plates. London, Simpkin, Marshall & Co., 1885.
- Evans G. Practical treatise on artificial crown and bridge work. Philadelphia: SS White Dental Manufacturing Co., 1888.
- Brown P. A treatise on crown and bridge work, or the adjustment of teeth without plates. Philadelphia: Private printing, 1892.
- Reigner H. Kronen und bracken arbeitern, ein lehrbuch. Leipzig: A Felix, 1895.
- Sheffield LT. An easy account of crown work and bridgework in dentistry. New York: Private printing, 1895.

Mason Detachable Tooth Co. Mason detachable porcelains for crown and bridge work: with instructions in the method of mounting. Mason Detachable Tooth Co., Red Bank N.J.; New York: Press of Andrew Kellogg, 1900.

Goslee HJ. Principles and practice of crown and bridgework. A practical, systematic modern treatise upon the requirements and technique of artificial crown work including some incidental reference to bridgework. 4th ed. New York: Consolidated Dental Manufacturing Co., 1903.

Roussel GA. Traite theorique et pratique des couronnes artificielles et du bridge work. Paris: D. Doin, 1906.

Chance PR. Ash's tube teeth in aesthetic crown and bridgework. London: Private printing, 1907.

Havestadt JF. Principles and techniques of crowns and bridges. Boston: Kitter and Flebee, 1915.

Peeso FA. Crown and bridgework for students and practitioners. Philadelphia: Lea & Febiger, 1916.

Krummnow F. Lehrbuch der kronen brucken und porzellantechnick. Berlin: Halensee Zahntechnischer Verlag, 1920.

Chayes HES. Movable removable bridgework. With a detailed, illustrated technique for the construction of a unilateral compound movable removable partial bridge, and a description of the instruments and attachments employed. New York: Chayes System Laboratories, 1922.

Columbus Dental Manufacturing Co. Steele's interchangeable tooth: illustrated: showing technical detail of construction and manipulation, embracing all features of their application. Columbus: Columbus Dental Manufacturing Co., 1924.

Haupt K, Reichborn Kjemmerud I. Moderne zahnartzliche krown und brucken arbeiten. Berlin: H. Mausser, 1929.

Doxtater LW. Procedures in modern crown and bridgework. The principles and technique of stationary and removable bridges. Brooklyn: Dental Items of Interest Publishing; 1931.

Knapp KW. Manual of fixed bridgework. New York: NY University Press Book Store, 1935.

Schwartz JR. Cavity preparation and abutment construction in bridgework. Brooklyn: Dental Items of Interest Publishing Co., 1936.

Hildebrand GY. Studies in dental prosthodontics. Vol. 1. Stockholm: Fahlerantz, 1937.

Knapp KW. Inlays and fixed bridgework. Buffalo: Williams Gold Refining Co., 1939.

Tylman SD. Theory and practice of crown and bridge prosthesis. St. Louis: The C V Mosby Co., 1940.

Coelho DH. A complete fixed bridge procedure. St. Louis: The CV Mosby Co., 1949.

Ewing JE. Fixed partial prosthesis. Philadelphia: Lea & Febiger, 1954.

General pathology

Kissane JM, ed. Anderson's pathology. 9th ed. St. Louis: The C V Mosby Co., 1990.

Myers EN, Suen JY. Cancer of the head and neck. 2nd ed. New York: Churchill Livingstone, Inc., 1989.

Guepp DR, ed. Pathology of the head and neck. New York: Churchill Livingstone, Inc.

General prosthodontics

Fauchard P. *Le Chirurgien Dentiste ou Traite des Dents* [two volumes]. Paris: 1728. (Section on artificial tooth replacements in Vol. 2.)

Mouton C. *Essai d'Odontotechnique, ou Dissertation sur les Dents Artificielles*. Paris: Private printing, 1746. (First complete book on artificial tooth replacements.)

Hunter J. *The natural history of the human teeth*. London: J. Johnson, 1755. (Section on artificial tooth replacements.)

Wooffendale R. *Practical observations on the human teeth*. London: J. Johnson, 1783. (Section on artificial tooth replacements.)

Dubois de Lhemant N. *A dissertation on artificial teeth: evincing the advantages of teeth made of mineral paste, over every denomination of animal substance: to which is added, advise to mothers and nurses on the prevention and cure of those diseases which attend the first dentition*. 1797 (Section on artificial tooth replacements.)

Fox J. *The history and treatment of the diseases of the teeth, the gums, and the alveolar processes, with the operations which they respectively require. To which are added, observations on other diseases of the mouth, and on the mode of fixing artificial teeth*. London: Thomas Cox, 1806. (Section on artificial tooth replacements.)

James B. *A treatise on the management of the teeth*. Philadelphia: Private printing, 1814. (First illustrated United States dental work with a section on artificial teeth.)

Delabarre CF. *Traite de la partie mecanique de l'art du chiru dentiste* [two volumes]. Paris: Private printing, 1820. (Section on artificial tooth replacements.)

Jobson DW. *Outlines of the anatomy and physiology of the teeth &c. Their diseases and treatment. With practical observations on artificial teeth*. Edinburgh: William Tait, 1834. (Section on artificial tooth replacements.)

Koecker L. *An essay on artificial teeth, obturators, & plates, with the principles for their construction and application, illustrated by 26 cases and 21 plates*. London: for S. Highley, 1835. (Section on artificial tooth replacements.)

Saunders E. *Mineral teeth: their merits & manufacture: with observations on those cases in which they are or are not applicable: and on the best means of preserving artificial teeth*. Philadelphia: Private printing, 1841. (Section on artificial tooth replacements.)

Arthur R. *A popular treatise on the diseases of the teeth: including a description of their structure and modes of treatment; together with the usual mode of inserting artificial teeth*. Philadelphia: Lindsay & Blakiston, 1845. (Section on artificial tooth replacements.)

Harbert SC. *A practical treatise on the operations of surgical and mechanical dentistry*. Philadelphia: Barrett & Jones, 1847.

Howard T. *On the IOBB of teeth; and on the best means of restoring them*. London: Simpkin and Marshall, 1857. (Section on artificial tooth replacements.)

Lukyn E. *Dental surgery and mechanism. A popular treatise on the preservation, management, and surgical treatment of the teeth and gums: with the most modern and improved modes of supplying the lobs of teeth*. London: Savill and Edwards, 1859. (Section on artificial tooth replacements.)

Allen J. Teeth: an improved method of constructing artificial dentures: combining five important points not heretofore attained: together with directions for the development and subsequent preservation of the natural teeth. Philadelphia: Private printing, 1860.

Mosely E. Teeth, their natural history: with the physiology of the human mouth, in regard to artificial teeth. London: Robert Hardwicke, 1862. (Section on artificial tooth replacements.)

Eskell FA. A new system for treating and fixing artificial teeth: the art to prevent the loss of the teeth: the instructions calculated to enable heads of families to adopt the author's practice of treating and preserving the teeth. Private printing, 1862.

Coles JO. On deformities of the mouth, congenital and acquires, with their mechanical treatment. Philadelphia: Lindsay and Blakiston, 1870. (Section on artificial tooth replacements.)

Coles JO. A manual of dental mechanics. 2nd ed. London: J & A Churchill, 1876. (Section on artificial tooth replacement.)

Dejardin A Jr. Restaurations prosthetiques faites dans les hopitaux de Paris, precede de l'hygiene de la bouche. Paris: E. Bicheron, 1877.

Burnot G. Contribution a l'etude de la graffe dentaire. Paris: J.B. Bailliere, 1886.

Cigrand BJ. The rise, fall and revival of dental prosthesis. Chicago: Periodical Publishing Co., 1892.

Parreidt J. Handbuch der Zahnersatakunde. Leipzig: A. Felix, 1893.

Cingrand BJ. A compendium of dental prosthesis arranged in questions and answers. Chicago: Periodical Publishing Co., 1894.

Essig CJ, ed. The American textbook of prosthetic dentistry. In contributions by eminent authorities. Philadelphia: Lea Brothers and Co., 1896.

Richarson J. A practical treatise on mechanical dentistry. Philadelphia: P. Blakiston's Sons and Co., 1903.

Cigrand BJ. The lower third of the face or the dental domain; a study of art in dentistry. Chicago: Blakely Printing Co., 1904.

Wilson GH. A manual of dental prosthetics. Philadelphia: Lea & Febiger, 1911.

Prothero JH. Prosthetic dentistry. 2nd ed. Chicago: Medico Dental Publishing Co., 1916.

Bodee CA, Rabell UL. Text book on prosthetic dentistry. New York: Private printing, 1921.

Martinier P, Villian G. Prothese. Paris: J.B. Bailliere and fils, 1922.

Clapp GW. The life and work of James Leon Williams. New York: The Dental Digest, 1925.

Logan JD. Dental prosthetics. Edinburgh: E & S Livingstone, 1926.

Shaw DM. Dental prosthetic mechanics. London: Edward Arnold and Co., 1927.

Nichols IG. Prosthetic dentistry. An encyclopedia of full and partial denture prosthesis. St. Louis: The C V Mosby Co., 1930.

Logan JD. Dental prosthetics. New York: Private printing, 1934.

Boyle HH. Principles and practice of applied dental aesthetics. London: H. Kimpton, 1936.

Hildebrand GT. Studies in dental prosthetics. Stockholm: A.B. Fahlerants, 1937.

Osborne J. Dental mechanics for students. London: Trinity Press Ltd., 1939.

Schwartz, JR. Modern methods of tooth replacement. Brooklyn: Dental Items of Interest Publishing Co., 1942.

Sears, VH. Basic principles of dentistry. New York: Pitman Publishing Corp., 1942.

Craddock FW. Prosthetic dentistry: a clinical outline. St. Louis: The C V Mosby Co., 1945.

Schweitzer JM. Restorative dentistry; a clinical photographic presentation. St. Louis: The C V Mosby Co., 1947.

Weinmann JP, Sicher H. Bone and bones. St. Louis: The C V Mosby Co., 1947.

Maxillofacial prosthodontics

Koecker L. An essay on artificial teeth, obturators, & plates, with the principles for the construction and application, illustrated by 26 cases and 21 plates. London: for S. Highley, 1935.

Ramsay R, Coles JO. The mechanical treatment of deformities of the mouth, congenital and accidental. London: J. Churchill and Sons, 1868.

Case CS. A practical treatise on the techniques and principles of dental orthopedia and prosthetic correction of cleft palate. Chicago: CS Case private press, 1921.

Fritsch C. Zahnartzliche sowie zahnartzlich chirurgische prothetik. Leipzig: G. Thieme, 1925.

Walker DG. The construction of vulcanite applicators for applying radium to lesions of the buccal cavity, lips, orbit and antrum. London: Private printing, 1938.

Beder OK. Surgical and maxillofacial prosthetics. Seattle: King's Crown Press, 1949.

Medical acronyms

Hamilton B, Guides B. Medical acronyms, symbols and abbreviations. 2nd ed. New York: Neal Schuman Publishers, Inc., 1988: 277 pages.

Mossman J, ed. Acronyms, initialisms and abbreviations dictionary. 15th ed. Detroit: Gale Research Inc., 1990.

Medical dictionaries

Stedman's Medical Dictionary. 25th ed. Baltimore: Williams and Wilkins, 1990.

Jablonsit S. Illustrated dictionary of dentistry. Philadelphia: W B Saunders Co., 1982.

Medical eponyms

Firkin BG, Whitworth JA. Dictionary of medical eponyms. Park Ridge, NJ: The Parthenon Publishing Group, 1987.

Removable partial denture prosthodontics

Kennedy E. Partial denture construction. Brooklyn: Dental Items of Interest Publishing Co., 1928.

Nichols IG. Prosthetic dentistry. An encyclopedia of full and partial denture prosthesis. St. Louis: The C V Mosby Co., 1930.

Doxtater LW. Full and partial denture prosthesis. Brooklyn: Dental Items of Interest Publishing Co., 1936.

- Elbrecht A. Systematik der abnehmbaren partiellen Prothesen. Leipzig: H. Meusser, 1937.
- Neurohr FG. Partial dentures; a system of functional restoration. Philadelphia: Lea & Febiger, 1939.
- Miller RG. Synopsis of full and partial dentures. St. Louis: The C V Mosby Co., 1942.
- Applegate SG, Perry CK. Outline for removable partial denture service. Detroit: Prosthetic Department, University of Detroit School of Dentistry, 1943.
- Godfrey RJ. A manual of removable partial denture design. Toronto: University of Toronto Press, 1948.
- J.M. Ney Co. The Ney surveyor book. Hartford: J.M. Ney Co., 1948.
- Fenn HRB, Liddelow KP, Gimson AP. Clinical dental prosthetics. London: Staples Press, 1953.
- Applegate OC. Essentials of removable partial denture prosthesis. Philadelphia: W B Saunders Co., 1954.
- Swenson MG, Terkla LG. Partial dentures. St. Louis: The C V Mosby Co., 1955.

Syndromes

- Magalini SI, Magalini SC, de Francisci G. Dictionary of medical syndromes. 3rd ed. Philadelphia: J.B. Lippincott Co., 1990.
- Jablonski S. Jablonski's dictionary of syndromes and eponymic diseases. 2nd ed. Malabar, FL: Krieger Publishing Co., 1990.

Appendix A

Tables and Measures

Celsius / Fahrenheit Conversion Table

°C	°F	°C	°F	°C	°F
-40	-40.0	9	48.2	58	136.4
-39	-38.2	10	50.0	59	138.2
-38	-36.4	11	51.8	60	140.0
-37	-34.6	12	53.6	61	141.8
-36	-32.8	13	55.4	62	143.6
-35	-31.0	14	57.2	63	145.4
-34	-29.2	15	59.0	64	147.2
-33	-27.4	16	60.8	65	149.0
-32	-25.6	17	62.6	66	150.8
-31	-23.8	18	64.4	67	152.6
-30	-22.0	19	66.2	68	154.4
-29	-20.2	20	68.0	69	156.2
-28	-18.4	21	69.8	70	158.0
-27	-16.6	22	71.6	71	159.8
-26	-14.8	23	73.4	72	161.6
-25	-13.0	24	75.2	73	163.4
-24	-11.2	25	77.0	74	165.2
-23	-9.4	26	78.8	75	167.0
-22	-7.6	27	80.6	76	168.8
-21	-5.8	28	82.4	77	170.6
-20	-4.0	29	84.2	78	172.4
-19	-2.2	30	86.0	79	174.2
-18	-0.4	31	87.8	80	176.0
-17	+1.4	32	89.6	81	177.8
-16	3.2	33	91.4	82	179.6
-15	5.0	34	93.2	83	181.4
-14	6.8	35	95.0	84	183.2
-13	8.6	36	96.8	85	185.0

-12	10.4	37	98.6	86	186.8
-11	12.2	38	100.4	87	188.6
-10	14.0	39	102.2	88	190.4
-9	15.8	40	104.0	89	192.2
-8	17.6	41	105.8	90	194.0

Multiples and Submultiples of the Metric System

Multiples and Submultiples	Prefix	Symbol	
1,000,000,000,000	(10 ¹²)	tera-	T
1,000,000,000	(10 ⁹)	giga-	G
1,000,000	(10 ⁶)	mega-	M
1,000	(10 ³)	kilo-	k
100	(10 ²)	hecto-	h
10	(10 ¹)	deka-	da
0.1	(10 ⁻¹)	deci-	d
0.01	(10 ⁻²)	centi-	c
0.001	(10 ⁻³)	mill-	m
0.000,001	(10 ⁻⁶)	micro-	μ
0.000,000,001	(10 ⁻⁹)	nano-	n
0.000,000,000,001	(10 ⁻¹²)	pico-	p
0.000,000,000,000,001	(10 ⁻¹⁵)	femto-	f
0.000,000,000,000,000,001	(10 ⁻¹⁸)	atto-	a

Avoirdupois to Metric Weight Conversion Table

OUNCES	GRAMS	OUNCES	GRAMS	POUNDS	GRAMS	KILOGRAMS
1/16	1.772	7	198.447	1 16 oz	453.59	
1/8	3.544	8	226.796	2	907.18	
1/4	7.088	9	255.146	3	1360.78	1.36
1/2	14.175	10	283.495	4	1814.37	1.81
1	28.350	11	311.845	5	2267.96	2.27
2	56.699	12	340.194	6	2721.55	2.72
3	85.049	13	368.544	7	3175.15	3.18
4	113.398	14	396.893	8	3628.74	3.63
5	141.748	15	425.243	9	4082.33	4.08
6	170.097	16 (1 lb)	453.59	10	4535.92	4.54

Measures of Capacity

Metric to Apothecary Liquid Measure

Metric	Approximate Apothecary Equivalent
1000 ml	1 quart
750 ml	1 ½ pints
500 ml	1 pint
250 ml	8 fluid ounces
200 ml	7 fluid ounces
100 ml	3 ½ fluid ounces
50 ml	1 ¾ fluid ounces
30 ml	1 fluid ounce
15 ml	4 fluid drams
10 ml	2 ½ fluid drams
8 ml	2 fluid drams
5 ml	1 ¼ fluid drams
4 ml	1 fluid dram
3 ml	45 minims
2 ml	30 minims
1 ml	15 minims
0.75 ml	12 minims
0.60 ml	10 minims
0.50 ml	8 minims
0.30 ml	5 minims
0.25 ml	4 minims
0.20 ml	3 minims
0.10 ml	1 ½ minims
0.06 ml	1 minim
0.05 ml	¾ minim
0.03 ml	½ minim

Apothecaries' – Metric Liquid Measure Table

MINIMS	MILLILITE RS	FLUID DRAMS	MILLILITE RS	FLUID OUNCES	MILLILITE RS
	0.06	1	3.70	1	29.57
	0.12	2	7.39		59.15
3	0.19	3	11.09	3	88.72
4	0.25	4	14.79	4	118.29
5	0.31	5	18.48		147.87
10	0.62	6	22.18	6	177.44
15	0.92	7	25.88	7	207.01
20	1.23	8 (1 fl oz)	29.57	8	236.58
25	1.54			9	266.16
30	1.85			10	295.73
35	2.16			11	325.30
40	2.46			12	354.88
45	2.77			13	384.45
50	3.08			14	414.02
55	3.39			15	443.59
60 (1 fl dr)	3.70			16 (1 pt)	473.17
				32 (1 qt)	946.33
				128 (1 gal)	3785.32

Metric – Apothecaries' Liquid Measure Table

MILLILITE RS	MINIMS	MILLILITE RS	FLUID DRAMS	MILLILITE RS	FLUID OUNCES
1	16.231	5	1.35	30	1.01
2	32.5	10	2.71	40	1.35
3	48.7	15	4.06	50	1.69
4	64.9	20	5.4	500	16.91
5	81.1	25	6.76	1000 (1 L)	33.815
		30	7.1		

Apothecaries' (Wine) Measure Table

MINIMS	Fluid DRAMS	Fluid OUNCES	GILLS	PINTS	QUARTS	GALLONS	Cubic Inches	Milliliter	Cubic Centimeters
1	0.0166	0.002	0.0005	0.00013			0.00376	0.06161	0.06161
60	1	0.125	0.0312	0.0078	0.0039	-	0.22558	3.6967	3.6967
480	8	1	0.25	0.0625	0.0312	0.0078	1.80468	29.5737	29.5737
1920	32	4	1	0.25	0.125	0.0312	7.21875	118.2948	118.2948
7680	128	16	4	1	0.5	0.125	28.875	473.179	473.179
15360	256	32	8	2	1	0.25	57.75	946.358	946.358
61440	1024	128	32	8	4	1	231	3785.434	3785.434

Measures of Mass

Avoirdupois Weight Table

GRAINS	DRAMS	OUNCES	POUNDS	METRIC EQUIVALENTS (grams)
1	0.0366	0.0023	0.00014	0.0647989
27.34	1	0.0625	0.0039	1.772
437.5	16	1	0.0625	28.350
7000	256	16	1	453.5924277

Apothecaries' Weight Table

Equivalents	Grains	Scruples	Drams	Pounds	Metric Ounces
1	0.05	0.0167	0.0021	0.00017	0.0647989
20	1	0.333	0.042	0.0035	1.296
60	3	1	0.125	0.0104	3.888
480	24	8	1.000	0.0833	31.103
5760	288	96	12.000	1.0000	373.24177

Metric Weight Table

MICRO-GRAM	MILLI-GRAM	CENTIGRAM	DECI-GRAM	GRAM	DECA-GRAM	HECTO-GRAM	KILO-GRAM	METRIC TON	EQUIVALENTS Avoirdupois	Apothecaries'
1	-						0.00001 5 gr			
103	1	-					0.01543 2 gr			
10'	10	1	-			-	0.15432 3 gr			
105	100	10	1	-			1.54323 5 gr			
108	1000	100	10	1	-		15.4323 56 gr			
107	10a	1000	100	10	1	-	5.6438 dr	7.7162 scr		
108	106	10°	1000	100	10	1	-	3.527 oz	3.215 oz	
109	106	106	10'	1000	100	10	1	-	2.2046 lb	2.6792 lb
1012	109	108	107	106	105	10'	1000	1	2204.62 23 lb	2679.22 85 lb

Troy Weight Table

GRAINS	PENNYWEIGHTS	OUNCES	POUNDS	METRIC EQUIVALENTS (grams)
1	0.042	0.002	0.00017	1.0647989
24	1	0.05	0.0042	1.555
480	20	1	0.083	31.103
5760	240	12	1	373.24177

Metric Measures of Length Table

MICRO-METER	MILLI-METER	CENTI-METER	DECI-METER	METER	DEKA-METER	HECTO-METER	KILO-METER	MEGA-METER	EQUIVALENTS
1	0.001	10 ⁻¹							0.000039 inch
10 ³	1	10 ⁻¹							0.03937 inch
10 ⁴	10	1	-						0.3937 inch
10 ⁵	100	10	1	-	-				3.937 inches
10 ⁶	1000	100	10	1	-				39.37 inches
10 ⁷	104	1000	100	10	1	-			10.9361 yards
10 ⁸	10 ⁵	104	1000	100	10	1	-		109.3612 yards
10 ⁹	10 ⁶	10 ⁵	10 ⁴	1000	1000	10	1		1093.612 1 yards
10 ¹⁰	10 ⁷	10 ⁶	10 ⁵	104	1000	100	10	-	6.2137 miles
10 ¹²	10 ⁹	10 ⁸	10 ⁷	10 ⁶	10 ⁵	10 ⁴	1000	1	621.370 miles

Apothecary to Metric Weight Conversion Table

GRAINS	GRAMS	GRAINS	GRAMS	SCRUPLES	GRAMS
1/150	0.0004	2/5	0.03	1	1.296(1.3)
1/120	0.0005	1/2	0.032	2	2.592(2.6)
1/100	0.0006	3/5	0.04	3 (1 3)	3.888(3.9)
1/90	0.0007	2/3	0.043	DRAMS	GRAMS
1/80	0.0008	3/4	0.05		
1/64	0.001	7/8	0.057	1	3.888
1/60	0.0011	1	0.065	2	7.776

1/50	0.0013	1 1/2	0.097(0.1)	3	11.664
1/48	0.0014	2	0.12	4	15.552
1/40	0.0016	3	0.20	5	19.440
1/36	0.0018	4	0.24	6	23.328
1/32	0.002	5	0.30	7	27.216
1/30	0.0022	6	0.40	8 (1 3)	31.103
1/25	0.0026	7	0.45	OUNCES	GRAMS
1/20	0.003	8	0.50		
1/16	0.004	9	0.60	1	31.103
1/12	0.005	10	0.65	2	62.207
1/10	0.006	15	1.00	3	93.310
1/9	0.007	20 (1 3)	1.30	4	124.414
1/8	0.008	30	2.00	5	155.517
1/7	0.009			6	186.621
1/6	0.01			7	217.724
1/5	0.013			8	248.828
1/4	0.016			9	279.931
1/3	0.02			10	311.035
				11	342.138
				12 (1 lb)	373.242

Metric to Apothecary Weight Conversion Table

MILLIGRAMS	GRAINS	GRAMS	GRAINS	GRAMS	EQUIVALENTS	
1	0.015432	0.1	1.5432	10	2.572	
2	0.030864	0.2	3.0864	15	3.858	"
3	0.046296	0.3	4.6296	20	5.144	"
4	0.061728	0.4	6.1728	25	6.430	"
5	0.077160	0.5	7.7160	30	7.716	"
6	0.092592	0.6	9.2592	40	1.286 oz	
7	0.108024	0.7	10.8024	45	1.447	"

8	0.123456	0.8	12.3456	50	1.607	"
9	0.138888	0.9	13.8888	100	3.215	"
10	0.154320	1.0	15.4320	200	6.430	"
15	0.231480	1.5	23.1480	300	9.644	"
20	0.308640	2.0	30.8640	400	12.859	"
25	0.385800	2.5	38.5800	500	1.34	lb
30	0.462960	3.0	46.2960	600	1.61	"
35	0.540120	3.5	54.0120	700	1.88	"
40	0.617280	4.0	61.728	800	2.14	"
45	0.694440	4.5	69.444	900	2.41	"
50	0.771600	5.0	77.162	1000	2.68	"
100	1.543240	10.0	154.324			

Metric Fluid Measure Table

MICRO-LITER	MILLI-LITER	CENTI-LITER	DECI-LITER	LITER	DEKA-LITER	HECTO-LITER	KILO-LITER	MEGA-LITER	EQUIVALENTS (Apothecaries' Fluid)
1							0.01623108 min		
103	1	-					16.23 min		
104	10	1	-				2.7 fl dr		
105	100	10	1	-			3.38 fl oz		
106	103	100	10	1			2.11 pts		
107	104	103	100	10	1	-	2.64 gal		
108	105	104	103	100	10	1	-	-	26.418 gals
109	106	105	104	103	100	10	1	-	264.18 gals
1012	109	108	107	105	105	104	103	1	26418 gals

1 liter = 2.113363738 pints (Apothecaries')

Metric to Apothecary Weight Conversions

Metric	Approximate Apothecary Equivalents
30.0 g	1 ounce
15.0 g	4 drams
10.0 g	2 ½ drams
7.50 g	2 drams
6.00 g	90 grains
5.00 g	75 grains
4.00 g	60 grains (1 dram)
3.00 g	45 grains
2.00 g	30 grains (1/2 dram)
1.50 g	22 grains
1.00 g	15 grains
750 mg	12 grains
600 mg	10 grains
500 mg	7 ½ grains
400 mg	6 grains
300 mg	5 grains
250 mg	4 grains
200 mg	3 grains
150 mg	2 ½ grains
125 mg	2 grains
100 mg	1 ½ grains
75 mg	1 ¼ grains
60 mg	1 grain
50 mg	¾ grain
40 mg	2/3 grain
30 mg	½ grain
25 mg	3/8 grain
20 mg	1/3 grain
15 mg	¼ grain
12 mg	1/5 grain

10 mg	1/6 grain
6 mg	1/10 grain
5 mg	1/12 grain
4 mg	1/15 grain
3 mg	1/20 grain
2 mg	1/30 grain
1 mg	1/60 grain

Appendix B

Prosthodontic Diagnostic Index (PDI) for Complete Edentulism

The official classification system for edentulism developed by the American College of Prosthodontists. The system classifies edentulous patient treatment complexity using four diagnostic criteria: (a) mandibular bone height, (b) maxillo-mandibular relationship, (c) maxillary residual ridge morphology, and (d) muscle attachments. These four criteria identify patients as Class 1 (ideal or minimally compromised), Class 2 (moderately compromised), Class 3 (substantially compromised), or Class 4 (severely compromised).

The PDI for the Edentulous Class 1 Patient

A patient who presents with ideal or minimally compromised complete edentulism that can be treated successfully by conventional prosthodontic techniques. The Class 1 patient exhibits (a) a residual mandibular bone height of at least 21 millimeters measured at the area of least vertical bone height, (b) a maxillo-mandibular relationship permitting normal tooth articulation and an ideal ridge relationship, (c) a maxillary ridge morphology that resists horizontal and vertical movement of the denture base, and (d) muscle attachment locations conducive to denture base stability and retention.

The PDI for the Edentulous Class 2 Patient

A patient who presents with moderately compromised complete edentulism and continued physical degradation of the denture supporting anatomy. The Class 2 patient exhibits (a) a residual mandibular bone height of 16-20 millimeters measured at the area of least vertical bone height, (b) a maxillo-mandibular relationship permitting normal tooth articulation and an appropriate ridge relationship, (c) a maxillary residual ridge morphology that resists horizontal and vertical movement of the denture base, and (d) muscle attachments that exert limited compromise on denture base stability and retention.

The PDI for the Edentulous Class 3 Patient

A patient who presents with substantially compromised complete edentulism and exhibits (a) limited interarch space of 18-20 millimeters and/or temporomandibular disorders, (b) a residual mandibular bone height of 11-15 millimeters measured at the area of least vertical bone height, (c) an Angle Class I, II, or III maxillomandibular relationship, (d) muscle attachments that exert a

moderate compromise on denture base stability and retention, and (e) a maxillary residual ridge morphology providing minimal resistance movement of the denture base

The PDI for the Edentulous Class 4 Patient

A patient who presents with the most debilitated form of complete edentulism, where surgical reconstruction is usually indicated and specialized prosthodontic techniques are required to achieve an acceptable outcome. The Class 4 patient exhibits (a) a residual mandibular bone height of 10 millimeters or less, (b) an Angle Class I, II, or III maxillomandibular relationship, (c) a maxillary residual ridge morphology providing no resistance to movement of the denture base, and (d) muscle attachments that exert a significant compromise on denture base stability and retention.

Appendix C

Prosthodontic Diagnostic Index (PDI) for the Partially Edentulous Patient

The official classification system for the partially edentulous patient developed by the American College of Prosthodontists. The system classifies the partially edentulous treatment complexity based on four diagnostic criteria: (a) the location and extent of the edentulous areas, (b) the condition of the abutment teeth, (c) the occlusal scheme, and (d) the residual ridge. These four criteria identify patients as Class 1 (ideal or minimally compromised), Class 2 (moderately compromised), Class 3 (substantially compromised), or Class 4 (severely compromised).

PDI for the Partially Edentulous (PE) Class 1 Patient

A patient who presents with (a) partial edentulism confined to a single arch, (b) minimal compromise to the abutment teeth, (c) an ideal or minimally compromised occlusion, (d) an Angle Class I molar and jaw relationships, and (e) an Angle Class I residual ridge (refer to the PDI for the Class I Completely Edentulous Patient, Appendix B). The PE Class 1 patient includes those with any anterior maxillary span not exceeding two incisors, any anterior mandibular span not exceeding four missing incisors, and any posterior span not exceeding two premolars or one premolar plus a molar.

PDI for the Partially Edentulous Class 2 Patient

A patient who presents with (a) partial edentulism that is moderately compromised, confined to a single arch, (b) moderate compromise to the abutment teeth in at least one sextant, (c) a moderately compromised occlusal scheme that requires adjunctive therapy, (d) an Angle Class I molar and jaw relationships, and (e) an Angle Class II residual ridge (refer to PDI for the Class II Completely Edentulous Patient, Appendix B). The PE Class 2 patient includes those with any anterior maxillary span not exceeding all incisors, any anterior mandibular span not exceeding four missing incisors, and any posterior span not exceeding two premolars or one premolar plus a molar or any missing canine.

PDI for the Partially Edentulous Class 3 Patient

A patient who presents with (a) partial edentulism that is substantially compromised, in multiple areas in one or both arches, (b) substantial compromise to the abutment teeth in three sextants, (c) a substantially compromised occlusal scheme requiring reestablishment of the entire occlusal scheme without a change in the vertical dimension, (d) an Angle Class II molar and jaw relationship, and/or (e) an Angle Class III residual ridge description (refer to PDI for the Class III Completely Edentulous Patient, Appendix B).

PDI for the Partially Edentulous Class 4 Patient

A patient who presents with (a) partial edentulism that is severely compromised in multiple areas and opposing arches, (b) severe compromise to the abutment teeth in four or more sextants, (c) a severely compromised occlusal scheme requiring reestablishment of the entire occlusal scheme and a change in the vertical dimension, (d) an Angle Class II and/or Angle Class III molar and jaw relationships, and (e) at least one edentulous ridge having a guarded prognosis. The PE Class 4 patient also includes congenital or maxillofacial defects, those with at least one severely compromised edentulous arch, severe manifestations of local or systemic disease, severe ataxia or dyskinesia and the refractory patient.

Appendix D

Prosthodontic Diagnostic Index (PDI) for the Completely Dentate Patient

The official classification system for the completely dentate patient developed by the American College of Prosthodontists. This standardized identification grouping of dentate patient treatment complexities is based on two criteria: (a) the condition of the teeth and (b) the occlusal scheme. These criteria identify patients as Class 1 (ideal or minimally compromised), Class 2 (moderately compromised), Class 3 (substantially compromised), or Class 4 (severely compromised).

Prosthodontic Diagnostic Index for the Completely Dentate Class 1 Patient

A patient who presents with (a) a dentition that is minimally compromised and (b) with contiguous, intact dental arches requiring prosthodontic treatment on three teeth or less that do not require adjunctive therapy (periodontal treatment, endodontic treatment, orthodontic treatment, etc.).

Prosthodontic Diagnostic Index for the Completely Dentate Class 2 Patient

A patient who presents with (a) a dentition that is moderately compromised with no edentulous areas, (b) an intact anterior guidance, (c) pathology affecting the coronal morphology of 4 or more teeth in only one sextant, and (d) teeth that require adjunctive treatment (periodontal treatment, endodontic treatment, orthodontic treatment, etc.) on four or more teeth in one sextant.

Prosthodontic Diagnostic Index for the Completely Dentate Class 3 Patient

A patient who presents with (a) a dentition that is substantially compromised with no edentulous areas, (b) an impaired anterior guidance, (c) substantial posterior occlusal wear and a normal vertical dimension, (d) pathology affecting the coronal morphology of 4 or more teeth in three or more sextants, and (e) teeth that are substantially compromised requiring adjunctive therapy (periodontal treatment, endodontic treatment, orthodontic treatment, etc.) in two sextants.

Prosthodontic Diagnostic Index for the Completely Dentate Class 4 Patient

A patient who presents with (a) a dentition that is severely compromised with no edentulous areas, (b) an impaired anterior guidance, (c) severe posterior occlusal wear with loss of vertical dimension, (c) the need for the reestablishment of the entire occlusion with a change in vertical dimension, and (d) teeth that require adjunctive therapy (periodontal treatment, endodontic treatment, orthodontic treatment, etc.) in three or more sextants.