

Joseph E. Chasteen

Essentials of
**Clinical
dental
assisting**

ESSENTIALS OF
Clinical dental assisting

Joseph E. Chasteen, D.D.S.

Director, Dental Assistant Utilization Program,
University of Michigan School of Dentistry, Ann Arbor, Michigan;
Member, Advisory Committee for Dental Health Programs,
Ferris State College, Big Rapids, Michigan; formerly Dental Director,
Washtenaw Community College, Ann Arbor, Michigan

WITH 542 ILLUSTRATIONS

Saint Louis

THE C. V. MOSBY COMPANY

1975

Copyright © 1975 by The C. V. Mosby Company

All rights reserved. No part of this book may be reproduced
in any manner without written permission of the publisher.

Printed in the United States of America

Library of Congress Cataloging in Publication Data

Chasteen, Joseph E 1943-
Essentials of clinical dental assisting.

Bibliography: p.

Includes index.

1. Dental assistants. 2. Dentistry. I. Title.
[DNLM: 1. Dental assistants. 2. Dentistry.
3. Technology, Dental. WU90 C489e]
RK60.5.C45 617.6'0233 75-22135
ISBN 0-8016-0963-1

VH/VH/VH 9 8 7 6 5 4 3 2

ESSENTIALS OF
Clinical dental assisting

*To a lovely lady
who taught me a way of life:*

my mother,
VIOLA R. PLESHA

Foreword

As the dental profession has progressed technically and scientifically, patterns of dental service have been revamped to take advantage of the new knowledge and skills.

The auxiliaries in dentistry also have been forced to make changes—to adapt to the varying routines and, instead of performing as “Jills of all skills,” have become highly specialized members of the dental health team.

As a result, preparation for the career of dental assisting has slowly changed from the office-trained assistant with “104 hours” of formal education to a more sophisticated one, even a two-year academic program.

Many state dental organizations have identified the services dental assistants can render in addition to the traditional duties. State laws have been changed to allow assistants with education to perform direct services to the patient. This necessitates more knowledge of the why and how of techniques

in dentistry. No longer is a survey textbook an adequate resource for the student; what is needed is a more in-depth study of information for her specific duties and responsibilities. The extra pair of hands must have direction and purpose, which come only through understanding procedures and acquiring skills needed to serve the patient.

The author has identified the need for a text to aid in this transition. More importantly, he has recognized that the ultimate quality of service to be rendered depends on skilled and knowledgeable members of the dental team.

This text provides a compilation of information written specifically for the chairside assistant. It is designed for the beginning auxiliary but is also an aid and reference for all who take part in the chairside techniques as employed today.

It is indeed a privilege to be asked to write the foreword to a text that is providing a response to the new educational demands of the dental assistant.

Helen M. Tuchner, C.R.D.A., B.A.

*Director, Dental Assisting Program,
University of Minnesota,
Minneapolis, Minnesota*

Preface

Although technical advances in modern dentistry are important, the most critical element in any profession lies in the quality of the individuals in that profession. Modern dental practice has become so complex that the dentist must delegate many tasks to auxiliary personnel. An increasing demand for dental services by the public emphasizes the need for an even greater reliance on dental auxiliaries to meet this demand. The skill of the dental auxiliary has a profound effect on the efficiency of the practice and on the quality of dental services that are rendered. Therefore, as dental assistants are given greater responsibility, they must have a corresponding increase in training and education in order to be prepared for their tasks.

The goal of this text is to contribute to the basic education of a dental assistant student in two ways. First, the text is limited to a discussion of the essential elements of clinical dental assisting, as the title implies. Because the text is thus limited, a more thorough presentation of both general and specialty dental practice is possible. Second, the level of the text is geared to the prospective dental assistant who has little or no previous knowledge of dentistry. Thus it is hoped that the student will find the principles that are discussed in each chapter easier to understand.

The trend in textbooks in dental assisting is to separate the subjects of dental materials, radiography, laboratory procedures, clinical dentistry, and business office procedures into different texts. This is a healthy separation because both the instructor

and the student have the freedom of choice of instructional materials in each of these areas. The independent selection of these materials helps to expose the student to the variety of philosophies and techniques used in dentistry today. Such exposure is not possible in one broad-spectrum text that attempts to cover all the principal subject areas in dental assisting.

Essentials of Clinical Dental Assisting represents a point of beginning for the prospective clinical dental assistant. On completion of the reading of the text, it is hoped that the student will be motivated to build on the fundamentals presented, through clinical experience and continued education. No text can be, or should be, the last word on any subject, but rather a step in the development of the subject at a given point in time.

It has been said that no one person writes a text alone, although the writer's existence can be lonely at times. People write textbooks, not one person. Although my hand produced the words herein, my mind was guided by contributions from students, colleagues, and friends. My deepest gratitude is extended to everyone who contributed to the contents of this book. The late Dr. James Bush, a real pioneer in auxiliary education, will always be remembered as the father of my career in dental assistant education and as the inspiration for this text.

Special thanks are due the following individuals who willingly gave their efforts to this publication. The monumental task of typing the manuscript was accomplished by my wife, Marilyn, and by my

friend Cathy Pearsall. The excellent photography was done by William Pelletier and his colleagues at the University of Michigan School of Dentistry. Jim Shulz, Lisa MacGregor, Karen Smith, Jeff Clark, and Regina Hardy provided the drawings. Donna Swatz, C.D.A., gave unselfishly of her time and expertise in the preparation of materials and proof-reading the manuscript, as well as her personal encouragement during the project. Betty Ladley, C.D.A., contributed ideas through our years of friendship and joint teaching efforts. Judy McKay, C.D.A., Loretta Carter, C.D.A., and David Stevens all contributed to the production of illustrative material.

To Dr. William Howard I offer my appreciation for the use of the superb illustrations from his *Atlas of Operative Dentistry*. Additional appreciation is extended to all the authors, publishers, manufacturers, practitioners, and laboratories that were gracious in granting permission to reproduce materials for use in this text.

Most important of all is the special thanks to my wife and children for their patience and understanding as I buried myself in the writing of the manuscript.

Joseph E. Chasteen

Contents

- 1 Preventive dentistry, 1
- 2 Oral hygiene procedures and aids, 20
- 3 Oral diagnosis and treatment planning, 31
- 4 Essentials of four-handed dentistry, 50
- 5 Common procedures applied in clinical treatment, 78
- 6 Basic operative instruments and supplies, 102
- 7 Processing dental instruments, 143
- 8 Introduction to operative dentistry, 153
- 9 Common procedures in operative dentistry, 162
- 10 Restorative dentistry, 186
- 11 Periodontics, 200
- 12 Endodontics, 218
- 13 Dentistry for children, 242
- 14 Oral surgery, 264
- 15 Prosthodontics, 286

chapter 1

Preventive dentistry

It was recognized long ago that the best treatment for any disease is to prevent it from occurring. The alternative to controlling disease is to treat it after it occurs. This alternative is less desirable by far because of the destructive nature of dental disease. The two most common dental diseases, dental caries and periodontal disease, result in the loss of normal tissue. In both disease categories the damaged tissue can never be regained. At best, dentists can only halt the progress of the disease before more damage occurs. The damaged tissue is gone forever. It seems reasonable to approach the establishment of dental health by protecting the hard and soft tissues one is given in the first place. This is the basis for the concept of preventive dentistry.

Preventive dentistry makes sense from a practical point of view. The economic impact of dental disease is a significant one. The cost of preventing dental disease is far less than that of treating it. In 1969 approximately \$4 billion was spent on dental treatment. This figure is based on the fact that less than one half the population visited a dentist. The high cost of living does not have to include large dental bills in the family budget if preventive measures are utilized to minimize or eliminate dental disease. *Prevention makes sense.*

Some startling figures clearly show that the dental profession has not been able to keep pace with the population growth and the subsequent demand for dental treatment. It is estimated that there are a billion untreated cavities in the United States. Multiple decay attacks approximately 95% of school-age children. Fifty million people have lost at least half their teeth.

Remember that less than one half the population is being seen by a dentist. This means that despite our much improved methods of providing treatment services, the dental profession still has a tremendous backlog of untreated dental disease. At the present rate of population growth and disease experience, the dental profession will never keep pace with the demand for treatment. The only rational approach to the problem is to prevent dental disease from occurring. *Prevention makes sense.*

The public has often looked for the panacea for dental problems. The pill that will prevent dental disease is not in existence and probably never will exist. However, dentistry has several key procedures at its disposal to greatly reduce and even eliminate dental disease. These preventive tools are the subject of this chapter. These tools will be effective if they are applied properly. Dental disease can be prevented. *Prevention makes sense.*

The dental assistant is a key person in the incorporation of prevention programs in private practice. An increasing number of dental practices are establishing formal prevention programs for their patients. The dental assistant is frequently placed in charge of this important function. It is therefore essential that the fundamentals of prevention be clearly understood before the assistant assumes these responsibilities.

DENTAL PLAQUE

Nature of dental plaque

In a discussion of the prevention of dental disease, the first order of business is to identify one of the prime culprits in the cause of both dental decay and periodontal disease. This culprit is plaque—a

soft, adherent collection of salivary products and bacterial colonies on the teeth. It accumulates on the surface of the teeth continuously throughout the life-span of most people in varying degrees. The only hope a patient has in eliminating this disease-producing material is to continually remove it by toothbrushing and dental-flossing.

Plaque growth begins approximately 6 hours after the thorough cleansing of the teeth. The first phase of plaque development is the deposition of adherent products from the saliva. These products are primarily composed of mucin, which forms a thin, adherent layer on the teeth called the *pellicle*. Once the pellicle has been deposited on the clean tooth surface, bacteria that inhabit the oral cavity attach themselves to the pellicle. After attachment, the bacteria multiply to form large masses of bacterial colonies. This occurs approximately 18 hours after a thorough cleaning of the teeth and continues until the plaque is fully matured by the end of 3 weeks.

Mature plaque consists primarily of bacteria of various types. Each type of organism functions in different ways. Some bacteria produce harmful chemical substances, and others produce substances that are needed by neighboring bacteria to survive. Still other organisms produce adherent substances that are interspersed with the bacteria and hold the plaque intact on the tooth surface. Additional minor components of plaque include salivary mucin, dead epithelial cells, and food debris. Mature plaque is in reality a microscopic community of different bacteria and other substances that functions to produce dental disease. The plaque is extremely adherent and cannot be easily washed away by simply rinsing the mouth. More vigorous methods such as toothbrushing and dental-flossing are required to remove it.

Dental plaque and dental caries

Streptococci are some of the first organisms to attach to the pellicle and multiply. The streptococci are capable of producing both polysaccharides and acids from carbohydrates that are consumed by the patient. This is important because the polysaccharides help to attach the streptococci to the pellicle. The acid that they produce is capable of demineralizing the enamel layer of the tooth. This demineralization is the first stage of dental caries.

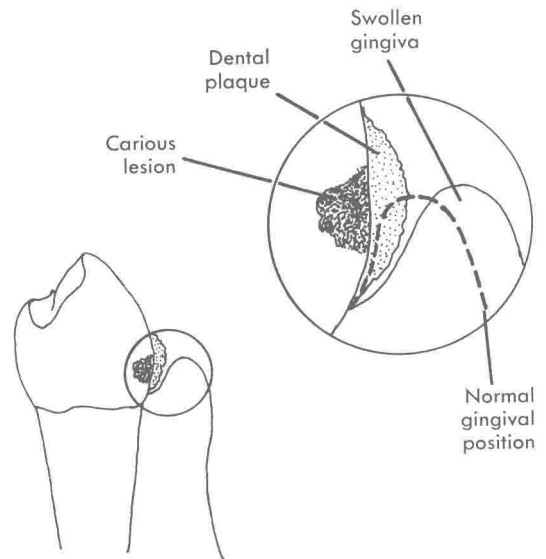


Fig. 1-1. Accumulation of dental plaque along the free gingival margin can irritate the gingiva and initiate dental caries.

Another organism, *Lactobacillus*, also converts carbohydrates to acids, which in turn attack the enamel. Other organisms in the plaque produce various substances that help in attaching the entire bacterial mass to the pellicle. The fact that these acid-producing bacteria are closely attached to the tooth surface contributes to a greater effectiveness of acid demineralization of the enamel. Because the acid is not diluted significantly by the saliva, it is far more concentrated, and therefore it is able to break down the enamel layer more quickly.

Dental plaque and periodontal disease

In addition to the caries-producing effect that plaque has on the tooth surface, it also irritates any soft tissue that comes in contact with it (Fig. 1-1). The gingiva that contacts the cervical and proximal surfaces of the teeth is most vulnerable to such irritation. The various bacterial types in the plaque mass produce a variety of chemical substances that are toxic to soft tissue. Any plaque that is allowed to accumulate at the cervical area of the teeth or in the interproximal area will result in irritation of the gingiva in these areas. Thus the process of periodontal disease begins.

Dental plaque and mouth odors

Dental plaque, besides being a factor in dental disease, is also a major contributor to breath odors. In fact, most mouth odors stem from the accumulation of dental plaque. The plaque mass has an unpleasant odor. If it is allowed to accumulate on the teeth and tongue, it will create an unpleasant mouth odor. This can be easily demonstrated by brushing the teeth without the use of dentifrice and then smelling the bristles of the brush. The unpleasant odor is readily detectable.

PLAQUE-CONTROL PROGRAMS

Objectives

A plaque-control program is a well-organized system of teaching patients to care for their teeth and supporting tissues between dental visits. These programs have three primary objectives. First, patients must understand what they are trying to achieve. Second, they must understand what they must do to accomplish their goal. Finally, patients must be motivated so that they will continue to pursue their goal regardless of the environmental and social influences that may tend to cause them to "give up the ship."

Suggested program format

Organization is a primary key to successfully implementing a plaque-control program. The dental staff that participates in the program must clearly understand its objectives and how to accomplish them. The dental assistant is fast becoming the principal participant in plaque-control programs.

The organization required for operating a teaching program of this type includes a consideration of available office space, appointment scheduling, and needed materials. These considerations are fundamental from the operational standpoint. There are other organizational considerations that relate to the actual teaching method used in motivating patients to reach the objectives of the program.

One plaque-control program* suggests utilization of four tried and true teaching principles:

1. Present the material in small increments.
2. Engage the patient in active participation.

3. Give the patient knowledge of the results immediately.
4. Structure a self-pacing program for each individual patient.

Essentially, the teaching principles are telling the teacher not to bombard the patient with all the information to be learned, all at once. Furthermore, whenever possible, the patient should actively participate by accomplishing tasks assigned to him. A common example of this is to have the patient place a disclosing agent on his teeth to identify plaque accumulation and then encourage him to brush his teeth. Immediate knowledge of the results of the toothbrushing will be gained when the patient examines his teeth and sees how well he removed the plaque that was stained by the disclosing agent. Before the patient is taught how to floss properly, he should fully understand and be able to perform proper toothbrushing. This is considered self-pacing. In other words, let each patient progress at his own rate. Be sure he masters one skill before attempting to proceed to another skill.

The greatest advantage of having one teacher for one student, and not a class of students, is to provide instruction, assistance, and immediate feedback at a rate that meets the need of the individual student—your patient. Keep these four teaching principles uppermost in mind as each patient seeks the full benefit of a plaque-control program.

The overall purpose of a plaque-control program is to motivate the patient to be interested in prevention in the first place. Once motivated to pursue the benefits of plaque control, the patient must be motivated to continue the efforts between dental appointments to maintain a healthy mouth. This objective is undoubtedly the most difficult for most dental health teachers. The ability of one human being to motivate another has been the subject of tremendous research for years. It seems that patients respond far more favorably toward preventive programs when the problem of plaque and the diseases it causes can be presented without creating anxieties in the patient. The notion that scare tactics motivate should be tossed out the window. Psychologists believe that an appeal to the patient's social needs and self-esteem are far better than scare tactics. The threat "clean your teeth or you'll lose them" either frightens the patient away immedi-

*John, R., and others: Developing a plaque control program, San Francisco, 1972, The Praxis Co.

ately or fails to be a long-term motivator in patients who respond to it initially.

Further training in patient motivation beyond what can be presented in this chapter should be sought by all dental personnel. There are excellent presentations given at almost every major dental meeting on this subject each year.

Designing a plaque-control program should include the following phases:

1. *Identifying the problem.* Patients must be made aware of the problem they are confronting with regard to plaque formation and how it affects them. Let patients discover the existence of plaque in their own mouths by actively involving them in the use of a disclosing agent. The use of a positive approach in small increments is considered the most favorable way to explain the patient's condition.

2. *Instructing in techniques.* After patients fully understand the problem they are dealing with and how it can be solved, they must then be assisted in seeking the solution. Specific instruction in oral hygiene techniques are taught in this phase. The instruction should proceed at the patients' own rate. Active participation and immediate evaluation should be encouraged here. (See Chapter 2.)

3. *Sustaining motivation.* Once patients understand the problem and have acquired the necessary skills to conquer it, they must be motivated to continue the application of these skills to prevent the recurrence of the problem. This is where motivational training is helpful to the dental health team. Frequent recall visits for patients for evaluation and encouragement are good motivational boosters.

All dentists who provide plaque-control programs for their patients will design the program to fit their patients' needs and their own practice schedule. The specific format of the daily schedule of the program is not as critical as are the three phases just described. All programs should in their own way contain these three phases. Keeping program schedules flexible to meet the needs of the individual patient offers the greatest opportunity for success.

DIETARY CONTROL OF DENTAL CARIES

Although there is continuous research into the cause of dental caries, a basic understanding of the

disease can be explained by the use of the following formulas:

1. Carbohydrates + Bacteria \rightarrow Acids
(Dental plaque)

2. Acids + Susceptible tooth structure \rightarrow Decay

In essence, the first formula states that some bacteria living in the oral cavity can convert carbohydrates to organic acids. When these acids are produced in close contact with the tooth, as would be the case in a plaque mass, they are capable of demineralizing tooth enamel. In other words, they cause tooth decay. The progress of dental caries continues through the enamel and into the dentin layer, and the tooth is progressively destroyed.

From a caries-prevention standpoint, plaque-control programs and periodic dental prophylaxis are both directed toward eliminating the plaque mass so that acids cannot be produced in significant quantities in close contact with the tooth surface.

Because bacteria can be harbored in the many pits and fissures found in normal tooth anatomy and because plaque control may not be 100% effective, further attention has to be paid to controlling tooth decay by other means.

Perhaps the most effective way to control dental caries is to regulate the dietary habits of the patient. Diet influences caries prevention in two ways:

1. *Tooth development and maturation.* Proper dietary intake of vitamins A, C, and D, calcium, phosphorus, and fluoride during tooth formation and maturation influences the resistance of tooth structure to future caries.

2. *Local effects of food on caries susceptibility.* Sticky foods, specifically carbohydrates, can be converted by certain bacteria into acids that demineralize the tooth structure. This local effect often overrides the resistance that the teeth acquire during their formation.

The local effect of food on the tooth surface is instrumental in *initiating* tooth decay, whereas the *progress* of decay in the tooth structure is greatly influenced by resistance the tooth acquired during its formation.

The thrust of dietary control of dental caries is primarily directed toward controlling the local effect that food has on caries production since it

tends to override the resistance of the tooth to decay to some degree. A reasonable approach to any dietary regimen requires that the basic nutritional needs of the patient be met while caries control is being accomplished. Therefore it is extremely important that the patient's present diet should be analyzed for both its basic food value and carbohydrate intake.

Dietary analysis

Nizel* suggests a practical method for dietary analysis. His method includes a diet diary, a diet evaluation summary, and a sweet intake summary. From these documents valuable dietary information can be obtained.

*Nizel, A. E.: The science of nutrition and its application in clinical dentistry, ed. 2, Philadelphia, 1966, W. B. Saunders Co.

Diet diary. The patient is given a form such as found in Table 1-1 and asked to fill it in over a 5-day period that includes a weekend day or a holiday. This is to obtain an adequate sampling of the patient's dietary habits. Encourage the patient not to alter the normal diet habits during this period. Absolutely every food and beverage must be recorded in the diary.

The method of preparation of each food must be listed as well. It is important to know whether the food was boiled, fried, raw, canned, or baked. The quantity of food should be indicated with household measures (cups, tablespoons, ounces). Do not forget to include between-meal treats!

Diet evaluation summary. After the diary is completed for a 5-day period, it is evaluated with the form shown in Table 1-2. This form is intended to evaluate the diet from a nutritional value stand-

Table 1-1. Food intake diary for 5 days (include one weekend day or a holiday)*

Name: _____

Fourth day†			Fifth day			Instructions
Food	Quantity	Prepared	Food	Quantity	Prepared	
Breakfast			Breakfast			<ol style="list-style-type: none"> Record every type of food consumed, solid or liquid, at mealtime, between meals, at the soda fountain, while watching television. Record also candies, Lifesavers, gum, cough drops or syrups. For each meal, list the food, preparation (fried, boiled, etc.), and amount in household measures (1 tsp, 1 tbsp, 1 cup [8 oz], 4 oz glass, number of pieces). For fruits and vegetables, record whether raw, fresh, frozen, or canned. Record amount of sugar or sugar products and cream or milk added to cereal, beverages, or other foods. Record foods in the order in which they are eaten. Particular information on extras is most important to us. <i>Do not leave out</i> the smallest detail.
10:00 A.M.			10:00 A.M.			
Lunch			Lunch			
3:00 P.M.			3:00 P.M.			
Dinner			Dinner			
Extras			Extras			

*From Nizel, A. E.: The science of nutrition and its application in clinical dentistry, ed. 2, Philadelphia, 1966, W. B. Saunders Co.

†Preceded by same setup for first, second, and third days.

Table 1-2. Diet evaluation summary*

Food groups	1st day	2nd day	3rd day	4th day	5th day	Average per day	Recommended number of servings			Difference
							Child	Adolescent	Adult	
Milk group						2	3-4	4 or more	2	Child: -2 Adolescent: OK Child: -2
Meat group			0			1+		2 or more		
Vegetable-fruit group Total number of servings, including those rich in vitamins C and A				 	0	2		4 or more		
Bread-cereal group (enriched or whole grain)	 	 		 		5		4 or more		

*Modified from Nizel, A. E.: *The science of nutrition and its application in clinical dentistry*, ed. 2, Philadelphia, 1966, W. B. Saunders Co.

point. This is a simplified way of checking to see if the patient is getting an adequate amount of food from each of the four basic food groups (milk, meat, vegetable-fruit, and bread-cereal). Table 1-3 can be used to determine the food group and normal serving values.

The entries are made in the dietary evaluation form by simply placing a mark in the appropriate box to indicate a serving in that food group. (Place $\frac{1}{2}$ in the column if only a half-portion is consumed.) The servings per day are averaged over the 5 days. If the daily serving average meets the recommended levels, no changes are made with respect to nutritional value of the diet. Increases in amounts of foods in any food group that is below the recommended levels are certainly in order. These are recorded as minus values in the difference column.

This diet evaluation summary is a good service to provide to the dental patient. Besides being useful information to the patient, it is also an expression of concern for the patient's well-being by the dental health team.

Sweets intake summary. The essence of dietary analysis in caries control is to determine the intake of sugars in the oral cavity. The more frequently decay-producing (cariogenic) bacteria are exposed

to sugars, the more acid they can produce. This implies that frequency of sugar intake is more significant than the total amount of sugar consumed, which is actually the case. One candy bar eaten all at one time will produce less acid than the same candy bar consumed in small quantities throughout the day. The reason is that the cariogenic bacteria can convert only so much carbohydrate (sugars) to acids at one time. The first few bites of the candy bar saturate the capacity of the bacteria. The remainder of the candy bar has little effect on acid production if it is eaten immediately. This concept explains why patients who snack a lot and have between-meal treats tend to have a greater decay experience.

The sweets intake summary (Table 1-4) is used to determine the frequency of sugar intake. The diet analyzer must take care in examining the diet for sweets because they are often hidden in the diet in the form of condiments, sauces, batters, breads, and canning syrups. This is why the method of preparation is important in recording the diet diary. Table 1-5 can be used as a guide to typical sugar content of various common foods.

Nizel suggests that the diet analyzer (dental assistant) circle in red all foods in the diet diary that contain sugar so that the patient can see how sug-

Text continued on p. 12.

Table 1-3. Foods and mixed dishes classified according to food group and amounts commonly considered as one serving*

Foods and mixed dishes	Amount commonly considered as one serving	Food group	Foods and mixed dishes	Amount commonly considered as one serving	Food group
Apple	1 medium size, 3-4 oz	Veg.-fruit	Chicken	½ breast or 1 leg and thigh (4 oz)	Meat
Apple juice	½ cup	Veg.-fruit	Chickory	½ cup (4 oz)	Veg.-fruit
Apricots	3-4 oz, 2-3 medium	Veg.-fruit	Clams	3-4 oz, cooked (½ cup)	Meat
Asparagus	½ cup (4 oz)	Veg.-fruit	Cocoa, made with milk	1 cup	Milk
Avocado	½ cup (4 oz)	Veg.-fruit	Collards	½ cup (4 oz)	Veg.-fruit
Bacon	2 slices	Fat	Corn	½ cup (4 oz)	Veg.-fruit
Bananas	1 medium	Veg.-fruit		1 ear, 5 inches	
Beans (dry)	½ cup cooked	Meat	Crackers, round, thin	6 crackers	Bread-cereal
Beans (fresh), green or wax	½ cup cooked (4 oz)	Veg.-fruit	Saltines	3 crackers	Bread-cereal
Beef	2-3 oz, cooked hamburger	Meat	Graham	3 crackers	Bread-cereal
Beet greens	½ cup (4 oz)	Veg.-fruit	Oyster	24 crackers	Bread-cereal
Beets	½ cup (4 oz)	Veg.-fruit	Cress	½ cup (4 oz)	Veg.-fruit
Berries	½ cup (4 oz)	Veg.-fruit	Cucumbers	½ cup (4 oz)	Veg.-fruit
Biscuits (baking powder)	1 medium, 2-inch diameter	Bread-cereal	Custard pudding	½ cup	Milk (½)
Blancmange	½ cup	Milk (½) Sugar, 3 tsp	Dandelion greens	½ cup (4 oz)	Sugar, 3 tsp Veg.-fruit
Bread, corn	1 piece, 2-inch square	Bread-cereal	Duck	2-3 oz, cooked	Meat
Bread, all varieties	1 slice (1 oz)	Bread-cereal	Egg, in any form	2	Meat
Broccoli	½ cup (4 oz)	Veg.-fruit	Eggplant	½ cup (4 oz)	Veg.-fruit
Brussels sprouts	½ cup (4 oz)	Veg.-fruit	English muffins	1 muffin	Bread-cereal
Butter	1 tsp	Fat	Escarole	½ cup (4 oz)	Veg.-fruit
Buttermilk	1 cup	Milk	Figs (fresh)	3 small	Veg.-fruit
Cabbage	½ cup (4 oz)	Veg.-fruit	Fish—cod, haddock, bass, mackerel, flounder, halibut	3-4 oz, cooked	Meat
Cantaloupe	¼ medium melon	Veg.-fruit	Fish chowder	1½ cup	Meat (½) Milk
Carrots	½ cup (4 oz)	Veg.-fruit			Veg.-fruit (½)
Cauliflower	½ cup (4 oz)	Veg.-fruit	Grapefruit	½ medium	Veg.-fruit
Cereals, cooked (oatmeal, corn meal, Cream of Wheat, etc.)	½ cup (1 oz)	Bread-cereal	Grapes	3-4 oz, 22 Tokay, 60 green, seedless	Veg.-fruit
Cereals, ready-to-eat, flaked or puffed	¾-1 cup (1 oz)	Bread-cereal	Greens, all kinds, cooked	½ cup	Veg.-fruit
Celery	½ cup (4 oz)	Veg.-fruit	Grits	½ cup (1 oz)	Bread-cereal
Chard	½ cup (4 oz)	Veg.-fruit	Guava	3 oz	Veg.-fruit
Cheese, cheddar, American, Swiss	1 oz	Milk	Heart	2-3 oz, cooked	Meat
Cheese, cream	2 tbsp	Fat	Ice cream	½ cup	Milk (¼)
Cheese, soft type, cottage	½ cup	Milk (½)	Kale	½ cup (4 oz)	Veg.-fruit
Cheese bits	½ cup (10-20 crackers)	Bread-cereal	Kidney	2-3 oz, cooked	Meat
Cherries	3-4 oz, 15 large	Veg.-fruit	Lamb	2 rib chops, ½ inch thick	Meat
			Lentils, dried	½ cup, cooked	Meat
			Lettuce	½ cup (4 oz)	Veg.-fruit
			Liver	2-3 oz, cooked	Meat
			Lobster	2-3 oz, cooked	Meat

*From Nizel, A. E.: The science of nutrition and its application in clinical dentistry, ed. 2, Philadelphia, 1966, W. B. Saunders Co.

Continued.

Table 1-3. Foods and mixed dishes classified according to food group and amounts commonly considered

Foods and mixed dishes	Amount commonly considered as one serving	Food group	Foods and mixed dishes	Amount commonly considered as one serving	Food group
Macaroni	½ cup	Bread-cereal	Popcorn	¾-1 cup	Bread-cereal
Macaroni and cheese	1 cup (8 oz)	Bread-cereal Milk	Pork	1 chop, 1 inch thick	Meat
Mango	3-4 oz	Veg.-fruit	Pies, fruit—2 crusts (apple, berry, peach, cherry, etc.)	⅙ of a pie	Bread-cereal Veg.-fruit Sugar, 2 tbsps
Margarine	1 tsp	Fat	Pies, cream—1 crust (custard, squash)	⅙ of a pie	Bread-cereal (½) Milk (½) Sugar, 2 tbsps
Mayonnaise	1 tbsp	Fat	Pie, lemon meringue—1 crust	⅙ of a pie	Bread-cereal (½) Sugar, 3 tbsps
Meat loaf	3-4 oz	Meat	Popovers	1 popover	Bread-cereal
Meat stew	1 cup (8 oz)	Bread-cereal (¼) Veg.-fruit Meat	Potato chips	8-10 pieces	Bread-cereal
Meat, lean—beef, lamb, pork, veal	3-4 oz	Meat	Potatoes	1 medium, 3-4 oz	Veg.-fruit
Melons, honeydew	¼ melon; ½ cup diced	Veg.-fruit	Pretzel sticks	½ cup (10-20 crackers)	Bread-cereal
Milk (fresh, diluted, evaporated, reconstituted, or dried)	½ cup	Milk	Prunes	4 medium	Veg.-fruit
Muffins	1 medium	Bread-cereal	Rabbit	2-3 oz, cooked	Meat
Mushrooms	½ cup	Veg.-fruit	Radishes	½ cup (4 oz)	Veg.-fruit
Nectarines	1 medium	Veg.-fruit	Rice	½ cup	Bread-cereal
Noodles	½ cup	Bread-cereal	Rolls, plain	1 roll, medium, Parker House, or cloverleaf	Bread-cereal
Nuts	2 tbsps, ½ oz	Meat (¼)	Rutabaga	½ cup (4 oz)	Veg.-fruit
Okra	½ cup (4 oz)	Veg.-fruit	Ry-Krisp	4 crackers	Bread-cereal
Olives	10-12	Fat	Salmon	2-3 oz, cooked	Meat
Onions	½ cup (4 oz)	Veg.-fruit	Sandwiches	2 slices bread	Bread-cereal
Oranges	1 medium, 3-4 oz	Veg.-fruit	Filling:		
Oysters	6-8 medium	Meat	2 oz meat, fish, chicken, egg, or peanut butter		Meat (½)
Pancakes	1, 4-inch pancake	Bread-cereal	1 slice cheese		Milk
Papaya	3-4 oz (½ cup)	Veg.-fruit	lettuce, tomato		Veg.-fruit
Parsnips	½ cup (4 oz)	Veg.-fruit	Sardines	2-3 oz	Meat
Peaches	1 medium, 3-4 oz	Veg.-fruit	Sauerkraut	½ cup	Veg.-fruit
Peanut butter	2 tbsps	Meat (½)	Sausage (bologna, frankfurters, liverwurst, etc.)	2-3 oz, 3 slices	Meat
Pears	1 medium, 3-4 oz	Veg.-fruit	1 large or 2 small frankfurters		
Peas, fresh or canned	½ cup, cooked	Veg.-fruit			
Peas, dried	½ cup, cooked	Meat			
Peppers	½ cup (4 oz)	Veg.-fruit			
Pineapple	3-4 oz, ½ cup diced	Veg.-fruit			
Plums	½ cup (1 medium)	Veg.-fruit			