Welcome to the Grip Strength Toolkit!

This toolkit is a member benefit to select dietetic practice groups. It is designed for self-study or for collaborative learning for modest-sized groups.

Grip strength examination is a rewarding skill for an RDN or DTR. Results contribute to a complete nutritional assessments and reassessments, provide supportive evidence for the nutrition diagnosis of protein-calorie malnutrition and changes with recovery. Grip strength also provides clinical data found to contribute to evaluation of age- or disease-related muscle wasting. Please review assigned readings.

Grip strength examination may seem overwhelming at first, however it is easy to do, and it is exciting to see growth in confidence and skill after learners perform as few as three practice examinations. The preparation and reading takes effort. However, as learners proceed through and complete the training program, they will be able to perform the examination correctly using the method described in the toolkit.

The toolkit is designed for individuals and small groups to:

- Learn together and cross-check methodology with one another.
- Perform the examination in clinical practice, health fairs, research projects, specialty clinics and in other care settings.
- Accurately document methodology and results.
- Align methodology and reliability for all clinicians sharing patients.
- Interpret and document findings and analysis in the context of a complete nutritional assessment.
- Obtain baseline and periodic clinical information to contribute to the nutrition diagnosis of protein-calorie malnutrition and monitor patient progress.
- Assure and document skills for an employer to consider for staff competency assessment.

The program is designed with multiple sections; all sections must be completed to learn the skills and achieve continuing professional education credits. It may be helpful to determine an on-site coordinator, clinical manager or arranger to help organize and assure individual and group progress. The program is organized so that small step-wise learning can proceed.

Program components are completed in this order:

1. Read the recommended readings to orient to the indications, use, rationale and application of grip strength.
2. Watch the suggested online short videos to see positioning of patient and examiner.
3. Read the DPG newsletter article (also in this toolkit), describing the methodology of the American Society of Hand Therapists (ASHT). The ASHT method is considered the “gold standard” for handgrip examination.
4. View the pre-recorded webinar that is posted to select DPG websites.
5. Practice: the examination process, recording the results, results interpretation and clinical analysis. Use simulated patient results and a simulated dynamometer (pattern provided) if a Jamar Plus® hand dynamometer is not available. The pattern can be traced and cut-out from foam core or cardboard.
6. Practice and cross-check one another in each of three roles, i.e., as the “patient”, the “examiner” and a “spotter” to assure understanding and check-back of the process and method.
7. Practice as the examiner, a minimum of three times. Record, interpret and document results. (Use simulated results from this packet until you have a dynamometer.)

8. Document your own completion dates of each of the steps completed on the "competency record" form provided in the toolkit.
9. Complete a quiz that is scored and managed on the Dietetic Practice Group website.
10. Comply with any organizational policies or procedures that are required to be designated competent to perform the examination at your worksite.

Disclaimers:

Completion of this program does not denote competency. Competency is determined by departmental and organizational policy and requirements. Learners are encouraged to collaborate with their colleagues, perhaps form study groups or schedule regular meetings to complete the program. Organizations may want to update policies and procedures to include grip strength examination in their existing nutritional assessment and malnutrition related policies and procedures.

Grip strength examination and results do not independently determine if a patient is malnourished. The results and analysis must be interpreted by an experienced and competent clinician, the exam performed with correct methodology and analyzed in conjunction with all other clinical and non-clinical information available at the time of the patient examination. The DTR is able to perform the examination and record results. The DTR will communicate with the RDN who will interpret and document the clinical analysis.

It is critical that all persons performing the grip examination strictly adhere to the correct methodology in order to achieve meaningful clinical results. The methodology taught in this toolkit is that of the American Society of Hand Therapists (ASHT), which is considered the "gold standard."(www.asht.org). The methodology requires the Jamar Plus® digital or dial hand dynamometer by Patterson Medical (www.pattersonmedical.com or www.performancehealth.com). The methodology published in the DPG newsletters is used with permission from the ASHT. At the time of this publication, there is no business relationship or remuneration by the author with Patterson Medical, Performance Health, the American Society of Hand Therapists or the American Society or Surgery of the Hand. The author has donated the toolkit to select Dietetic Practice Groups of the Academy of Nutrition and Dietetics as a member benefit, to encourage learning, identification, documentation and treatment of protein-calorie malnutrition.

At the time of this publication, the American Society for Enteral and Parenteral Nutrition and the Academy of Nutrition and Dietetics have not described a preferred methodology or equipment for hand grip examination for the purpose of nutrition or medical diagnoses of protein-calorie malnutrition in adults. Should these professional groups make future recommendations, learners are encouraged to update their skills to meet those recommendations.

This toolkit is solely for educational purposes and is not intended to diagnose or treat disease or replace assessment or treatment by qualified health professionals.

Learning Objectives:

1. Enable skills to identify and report patient functional status using handgrip strength, as one of the clinical characteristics of protein-calorie malnutrition as described in the *Consensus*.
2. Assure correct methodology and documentation of handgrip strength test results.
3. Adhere to department policy in conducting the examination, interpretation and reporting of examination results.
4. Verify competence in correct interpretation of the examination results.
5. Assure patient safety in conducting the grip strength examination.
6. Enable staff to articulate and report to others the purpose and impact of the test as part of a nutritional focused physical assessment as part of a complete nutritional assessment and reassessment.

Presenter: Terese Scollard, MBA RDN, LD FAND
Facilitator: Sponsoring Dietetic Practice Groups
Participants: Accountable for competency verification by facility and employer policy.
Reading and Video Materials: Provided and required
Suggested Learning Codes: 3030; 3010; 5285; 3000
Functional Essential Practice Competencies: Sphere 10: Clinical Care 10.1, 10.2, 10.3, 10.5.1
Registration: DPG members register or access the program and materials according to instructions provided by the respective dietetic practice groups.

Estimates of Time

Time*	Topic
100 minutes	Pre reading assigned documents (not included in CPE hours)
10 minutes	Orientation to view webinar and set up practice equipment and supplies
75 minutes	Review of key points and readings using HGS Powerpoint "Handgrip Assessment for Application in Malnourished Populations"; Questions/answers/discussion
30 minutes	Teacher demonstration of technique, worksheet, practice on paper, Questions/answers/discussion
45 minutes	Structured practice using dynamometer in small groups
20 minutes per student	Demonstration to designated trainer of methodology (one return practice demo and 2 tested demos with worksheet scoring and documentation)
20 minutes Testing per student	Score 95% or more. Test is provided in online training program. Sponsors are asked to control access to the test questions and answers.
200 minutes = 3 hours	Approximate total time

Appreciation and Thank You for help along the way!

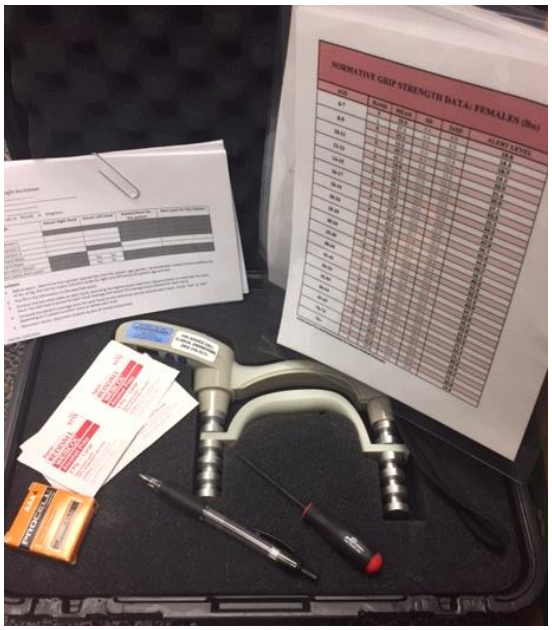
- Amy Rinder, OTR/L, CHT
- The American Society of Hand Therapists
- 2016-2017 DPG Chairs and officers of DNS, CNM, ON, MN, HA
- Clinical nutrition staff present and past, of Providence Health and Services, Portland, Oregon
- Jennifer Cohen, Layout
- Julie McGuire MS RDN LD
- Dietitians: Amy Leininger, Nancy Frazeur, Ariela Nielson, Christina Heiberg, Leslie Weidner]

I hope you find this toolkit helpful to implement grip strength examination to identify, document undernourished patients. Increased use of grip strength will provide clinical information and data that will influence and ultimately help the overall goal to reduce the incidence of protein-calorie malnutrition in our society and health care systems.

Terese Scollard MBA RDN LD FAND
MySurgeryPlate LLC
July 2017

More Disclaimers:

The views expressed in this publication are those of the author and do not necessarily reflect policies and/or official positions of the Academy of Nutrition and Dietetics, the American Society of Parenteral and Enteral Nutrition, the American Society of Hand Therapists, the American Society for Surgery of the Hand, Patterson Medical, Performance Health, or the manufacturers of the Jamar® Hand Dynamometers. Mention of product names in this publication does not constitute endorsement by the author or the Academy of Nutrition and Dietetics or the American Society of Parenteral and Enteral Nutrition the American Society of Hand Therapists or the American Society for Surgery of the Hand, Patterson Medical, or Performance Health or the manufacturers of the Jamar Hand Dynamometers. The information in this publication is for educational and reference use only and does not constitute the rendering of legal, financial or other professional advice by the author or the Academy of Nutrition and Dietetics, the American Society of Parenteral and Enteral Nutrition, the American Society of Hand Therapists, the American Society for Surgery of the Hand, Patterson Medical, Performance Health, or the manufacturers of the Jamar Hand Dynamometers. The author, the Academy of Nutrition and Dietetics, the American Society of Parenteral and Enteral Nutrition, the American Society of Hand Therapists, the American Society for Surgery of the Hand, Patterson Medical, Performance Health, and the manufacturers of the Jamar Hand Dynamometers disclaims responsibility for the application of the information contained herein.



Quick Start Guide

The recommended sequence of learning is described below:

If learning with a group, review the materials and organize the group; set deadlines and structure that is helpful and achievable for the group.

Right away, start work to obtaining a Jamar Plus® hand dynamometer. It takes some time to locate your vendor representative and to process the purchase. If unable to obtain a hand dynamometer, a same-size pattern is included that can be used to cut out a model on foam core or cardboard. This simulation model will assist with correct positioning of the examiner and patient when practicing. Use the simulated dynamometer in the meantime until you can obtain one. Simulated measurement results are included in this toolkit.

Step 1

- Read
  - Read the toolkit introduction, the DPG newsletter article (the ASHT methodology), the background readings and watch the videos.
  - Some of the readings are open-source, some may be obtained from medical libraries and universities. Read all articles you can obtain for the fullest understanding.
  - Reading before viewing the video is critical to understand the purpose, strengths, weaknesses and applications of the grip strength examination. Reading helps learners correctly apply and interpret results for the purpose of connecting grip strength to protein-calorie malnutrition.
  - Read as many articles as possible before viewing the webinar.
  - If your situation is such that in the future you intend to study a specific population for research or other purposes, a thorough review of grip examination literature for that specific population is recommended.

Step 2

- Obtain a Jamar Plus® (digital preferred) hand dynamometer, or a Jamar® dial hand dynamometer. All dynamometers are not the same.
  - Rehabilitation or occupational therapy departments often contract for rehabilitation equipment, and thus have better prices than buying direct from online websites.
  - Once you have the hand dynamometer, make sure it is approved for use by your facility biomedical engineering department.
  - Read the instruction book that comes along with the dynamometer.
  - If you do not have a dynamometer, you can still complete the training using the simulated model and simulated results provided.

Step 3

- Print the toolkit forms and materials and distribute to each member of your study group.

Step 4

- Watch the webinar on your DPG website as often as you like.
  - Feel free to stop and start the webinar as needed.
  - Review the worksheet, forms and supplies when watching the webinar to become familiar with their use.
  - Note how the worksheet is partially pre-filled out before performing the exam on the patient.

Step 5

- Practice performing the examination as a "patient", "examiner" and "spotter"
  - Record "patient" results on the worksheet for the "patient" age, sex and hand. Complete the calculations, results reporting, and analysis using the forms and samples for reference.
  - If you are simulating the dynamometer and the results, fill out the worksheet using the simulated patient results document found in the toolkit.

Step 6

- Record all the steps taken on your competency record form, including the dates each step was completed.
- Once Steps 1-5 are complete, take and pass the online quiz through your DPG website to obtain CPE. Retain the CPE record.

Step 7

- Present materials (competency form, CPE certificate, worksheet results, documentation results and any organizational requirements) to your supervisor. Retain copies of your records in event your competency is questioned.
- Perform the grip strength examination on your patients as part of a complete nutritional assessment.
- Continue to perform handgrip exam periodically to retain competency and skills. Retain records of exam performance as determined by your supervisor to recognize ongoing competency.

Forms and supplies:

Grip Strength Worksheet

Grip Strength Normative charts with "Alert Level" of minus 2 Standard Deviations from the mean. (Samples created by author from the Jamar Plus® normative tables)

Jamar® Hand Dynamometer or simulated dynamometer cut out from foam core or cardboard

Seating arrangements – chairs/landing area

Seat "patient" with arms not resting on chair arms, so arms are free, sitting straight up

Seat such that examiner can be seated directly opposite "patient"

Allow space for "spotter" to observe "patient" and examiner to assure positioning and correct methodology is performed

Spotter Checklist document to remind of correct positioning and process

Table or landing space to place worksheet to record results during exam (it is also okay for another person to record results with examiner reporting each test result verbally)

Writing instrument

Calculator to average the 3 measured readings from each hand

Sign-in sheet for group sessions

Competency sheet for each learner to record their own completed steps

Simulated results data sheet if using simulated dynamometer

Sample electronic health record optimization request to incorporate grip strength results.

End, Quick Start Guide

Table of Contents

About the Author:

Terese Scollard MBA RDN LD FAND is regional clinical nutrition manager with Providence Health and Services in Portland, Oregon, and owner of MySurgeryPlate LLC. Terese has worked at multiple hospitals in both clinical and management roles, with both in- and outpatient responsibilities, as a consultant, in private practice and long term care. She has served over 29 years as Regional Clinical Nutrition Manager with Providence Health and Services in Oregon. Since 1990, Terese and her colleagues have supported action to recognize, prevent, intervene, document, integrate care and address compliance for disease-related malnutrition. She has completed over 50 presentations related to malnutrition, including the first national webinar by the Academy of Nutrition and Dietetics on coding and malnutrition, in 2009. Terese served on the Academy of Nutrition and Dietetics Malnutrition Work Group that created the 2012 *Consensus Characteristics of Adult Malnutrition*, and the document, *Physical Exam: Parameters Useful in the Assessment of Nutritional Status*. She was a member of the first Academy Nutrition Informatics task force. Terese is a site reviewer with the Accreditation Council for Education in Nutrition and Dietetics. She was awarded the Outstanding Dietitian of the Year by the Oregon Academy of Nutrition and Dietetics in 2011, and in 2014 was an inaugural recipient of the Academy Foundation Abbott Nutrition Alliance Award that recognized work on malnutrition. She has been awarded Providence grants to address malnutrition in ambulatory settings and to fund patient-targeted malnutrition educational materials to support community outreach. Terese manages clinical nutrition practice and policy affecting the Providence facilities in Oregon, and is part of a multi-state Providence clinical nutrition council that advises and supports organizational best-practice nutrition policy. She is 2017-2018 Chair-elect of the Clinical Nutrition Management Dietetic Practice Group of the Academy of Nutrition and Dietetics.

Hand Grip Assessment for Application in Malnourished Populations
Dietitians in Nutrition Support DPG
Oncology Nutrition DPG
Clinical Nutrition Management DPG
Medical Nutrition Therapy DPG
Healthy Aging DPG

Some publications may offer open access whereas others may require purchase. Refer to your specific institution library or organizational membership (ASPEN, the Academy, etc) for online full text availability.

Pre-Presentation Reading and Video:
It is recommended to read and view before the program presentation.

1. Consensus Statement of the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition: Characteristics Recommended for the Identification and Documentation of Adult Malnutrition (Undernutrition); *Journal of the Academy of Nutrition.* Note Erratum in J Acad Nutr Diet. 2012 Nov;112 (11):1899.
   http://www.sciencedirect.com/science/article/pii/S2212267212003280 or
   https://www.clinicalkey.com/#!/content/journal/1-s2.0-S2212267212003280

2. Russell, Mary K, Functional Assessment of Nutrition Status. *Nutrition in Clinical Practice* 2015
   http://ncp.sagepub.com/content/30/2/211.full.pdf+html

3. Norman K, Stobaus N, Gonzalez MC, Schulzke J-D, Pirlich M. Hand grip strength: Outcome predictor and marker of nutritional status. *Clin Nutr*. 2011;30 (2):135-142.
   https://www.clinicalkey.com/#!/content/playContent/1-s2.0-S0261561410001834 or
   http://www.sciencedirect.com/science/article/pii/S0261561410001834

3. *Clinical Assessment Recommendations 3rd Edition*, American Society of Hand Therapists. Suggest contacting Occupational Therapy for the HGS section in 2nd edition. (pages 1-8)
   https://www.asht.org/practice/clinical-assessment-recommendations

4. The Jamar Plus® Digital dynamometer (select URL below) will be used for training during this program. If you have access to different equipment, you may bring it. Note that standards and cut points may change with different manufacturers. Users should utilize the materials that are recommended for their particular dynamometer. Physical therapy and occupational therapy programs have access to equipment catalogs and vendors at contract pricing. Hydraulic dynamometers are typically recommended over spring dynamometers.
   www.pattersonmedical.com (May change to www.performancehealth.com)

5. Windsor JA, Hill GL. Grip strength: A measure of the proportion of protein loss in surgical patients. *Br J Surg*. 1988;75(9):880-882.
   http://onlinelibrary.wiley.com/doi/10.1002/bjs.1800750917/abstract

6. NIH Toolbox: Motor: Grip Strength Test Locate Grip Strength section of online learning, under "Motor Tests" #52 http://www.nihtoolbox.org/WhatAndWhy/Assessments/E-learning%20files/player.html Video Demonstration, showing positioning, letting client hold the dynamometer to understand and become familiar in order to help comfort to get accurate results. Can let client squeeze very gently, only, to learn how it feels. Video does not demonstrate rapid exchange as recommended by ASHT. Examiner and patient positioning is aligned with the AHST. Accessed August 26, 2016.

7. Grip Strength Measurement of the Hand. Note positioning, and Rapid Exchange technique which is aligned with the ASHT. However, the examiner does not write down results, which you will need to do; and this patient is injured, so we would not perform on recently injured hand. https://www.youtube.com/watch?v=frcNPiLnWRo Erasmus University, The Netherlands. Accessed August 26, 2016.
8. Sarcopenia: European consensus on definition and diagnosis. Report of the European Working Group on Sarcopenia in Older People. Age and Ageing 2010; 39: 412–423 http://ageing.oxfordjournals.org/content/39/4/412.full.pdf+html or https://www.ncbi.nlm.nih.gov/pubmed/20392703

9. Epidemiology of Sarcopenia: Determinants throughout the Lifecourse 2016 International Conference on Frailty and Sarcopenia Research, 2016. Educational video. Accessed December 8, 2016.: https://www.youtube.com/watch?v=eqRfG-9z3Z4

10. Scollard TM. Handgrip strength assessment: a skill to enhance diagnosis of disease-related malnutrition. Support Line. 2017;39(2):7-13.

NOTE: Normalization tables used with the Jamar® dynamometer:

- Mathiowetz, V. et al, (1985) Grip and Pinch Strength: Normative Data for Adults. Archives of Physical Medicine and Rehabilitation, 66(2)69-74.
- Mathiowetz, V. et al, (1986) Grip and Pinch Strength: Norms for 6-19-Year Olds. American Journal of Occupational Therapy. 40(10) 705-711.
- Grip Strength: Results of Meta-Analysis of GS data, Journal of Geriatric Physical Therapy. Vol.30;1:07, p. 28-30.

Optional Reading and Viewing:

1. Matos LC, Tavares MM, Amaral TF. Handgrip strength as a hospital admission nutritional risk screening method. *European J Clin Nutr*. 2007;61(9):1128-1135. http://www.nature.com/ejcn/journal/v68/n12/full/ejcn2014226a.html

2. Schlussel MM, dos Anjos LA, de Vasconcellos MTL, Kac G. Reference values of handgrip dynamometry of healthy adults: A population-based studies. *Clinical Nutrition*. 2008;27(4):601-607. http://www.sciencedirect.com/science/article/pii/S0261561408000721 or https://www.clinicalkey.com/#!/content/journal/1-s2.0-S0261561408000721

2. Mathiowetz V, Kashman N, Volland G, Weber K, Dowe M, Rogers S: Grip and pinch strength: normative data. *Arch Phys Med Rehabil* 66:69-72, 1985. http://www.archives-pmr.org/article/S0003-9993(15)00291-9/abstract

3. Jakobsen LH, Ingeborg RK, Kondrup J. Validation of handgrip strength and endurance as a measure of physical function and quality of life in healthy subjects and patients. *Nutrition* 2010; 26:542-550. http://www.sciencedirect.com/science/article/pii/S0899900709002846 or https://www.clinicalkey.com/#!/content/journal/1-s2.0-S0899900709002846

4. Skeletal Muscle Proteolysis, *Basic Science Review for Surgeons*, Saunders, Philadelphia, 1992. pg 316-325 Read pg 321.(A health library can obtain this reference).

5. Bohannon, RW. Reference Values for adult grip strength measured with Jamar dynamometer: a descriptive meta-analysis. Physiotherapy 92 (2006) 11-15; Approach more likely in research setting. http://www.sciencedirect.com/science/article/pii/S0031940605000878

6. https://www.youtube.com/watch?v=y9r6jqy6tdE Matheson System. Isometric grip for a functional capacity assessment. This video shows similar to ASHT, however, the tester changes the setting of the grip because of Isometric testing. Do not do this. Start and stay at the same setting (Typically position number 2). Accessed August 26, 2016.

7. Measuring Grip Strength; https://www.youtube.com/watch?v=phAC-VIWr5Q. Schrpp, Heineck, demonstrate the testing of grip strength with the Jamar dynamometer. Shows how the static needle version works. This demo only uses one hand. The ASHT recommends using both hands, alternating between hands (rapid exchange). Discusses malingering, which is more likely in PT and OT settings. Accessed August 26, 2016.

8. Silva, C., Amaral, TF, Handgrip Strength and Nutrition Status in Hospitalized Pediatric Patients, Nutrition in Clinical Practice Volume 29, No. 3, June 2014, 380-385.

9. Frailty Sarcopenia https://youtu.be/_fBYAAiKCZs Accessed December 9, 2016.

10. Sarcopenia https://www.youtube.com/watch?v=4LhH3scPGao Accessed December 9, 2016.

11. Handgrip Strength and Associated Factors in Hospitalized PatientsRita S. Guerra; Isabel Fonseca, MSc; Fernando Pichel, BSc Hons; Maria T. Restivo, PhD; and Teresa F. Amaral, PhD *JPEN J Parenter Enteral Nutr*. 2015;39:322-330)

12. Handgrip Strength at Admission and Time to Discharge in Medical and Surgical Inpatients Joana Mendes, MSc; Ana Azevedo, MD, PhD; and Teresa F. Amaral, PhD Volume 38 Number 4 May 2014 481–488

13. Comparison Between Handgrip Dynamometry and Manual Muscle Testing Performed by Registered Dietitians in Measuring Muscle Strength and Function of Hospitalized Patients Lindsay Dowhan, MS, RD, CSO, LD, CNSC; Robert DeChicco, MS, RD, LD, CNSC; et al. CNSC Journal of Parenteral and Enteral Nutrition Volume 40 Number 7 September 2016 951–958

14. Handgrip strength testing: A review of the literature. Innes E.; Australian Occupational Therapy Journal (1999) 46, 120-140.

Handgrip Strength Assessment: A Skill to Enhance Diagnosis of Disease-related Malnutrition

Terese M. Scollard, MBA, RDN, LD, FAND

Abstract

The handgrip strength examination recommended and published by the American Society of Hand Therapists (ASHT), and also recommended by the American Society for Surgery of the Hand (ASSH), provides a standardized method for measuring a patient's functional ability that is influenced by protein-calorie malnutrition (PCM). Handgrip, or grip strength (GS) assessment, is a clinical characteristic of adult PCM, as described in the *Consensus* statement of the Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) for identifying and documenting adult malnutrition (undernutrition) (1). The Centers for Disease Control and Prevention has recognized an International Classification of Diseases (ICD-CM-10) diagnosis of sarcopenia (2). Dietetics professionals can apply the methodology described by the ASHT at the patient bedside or clinic to obtain reliable measurements that can contribute to diagnosing PCM or sarcopenia. Determination of an accepted GS methodology by professional nutrition organizations can aid in efforts to align clinical practices, which can provide more objective measurements for diagnosis and for outcomes from nutrition interventions. Developing competence in GS assessment is an important basic skill that registered dietitian nutritionists (RDNs) can apply in clinical nutrition practice and research.

Introduction

Many RDNs learned of GS assessment as a method to evaluate patient functional ability from the 2012 Academy/A.S.P.E.N. *Consensus* statement on characteristics of adult disease-related malnutrition (1). GS is a method to assess maximal voluntary effort as a measure of a patient's functional ability that reflects the impact of nutritional status on muscle mass and muscle function. Several publications provide enlightening discussion and review of the purpose, application, strengths, and weaknesses of GS as a nutritional status marker (3–10).

This article and an online toolkit teach GS examination methodology, practical applications, strengths and weaknesses of the examination, assessment of staff competency, interpretation of results, documentation, and opportunities for GS examination related to PCM. The toolkit is a member benefit for select dietetic practice groups and will be posted on the respective dietetic practice groups' websites. The member benefit includes a prerecorded training webinar, supplemental materials, and other related documents and forms.

The ASHT released the third edition of *Clinical Assessment Recommendations* and *Online Companion* (11) in 2016. The ASHT book and online document outlines the validity and rationale for the ASHT grip assessment method using the Jamar®Plus+ or dial Jamar® handgrip dynamometer (Patterson Medical, Warrenville, IL) (12). This dynamometer and method is recommended by both the ASHT and the ASSH for use with adults and children because of its reliability among and between trained examiners and the consistency and reliability of the dynamometer itself (11). There are four types of hand dynamometers: hydraulic, pneumatic, mechanical, and strain (13). In addition, there are other methodologies, and the Academy/A.S.P.E.N *Consensus* (1) does not discuss or recommend a preferred approach for clinical practice or research. The ASHT methodology for the Jamar® Plus+ digital handgrip dynamometer is the focus of this article because of the precision of measurement with the digital readout and because both the dynamometers and methodology are considered the "gold standard" devices and recommended by the ASHT and the ASSH (11). Research methodology may vary and should be considered as part of the population being studied. The focus of this article is for bedside or clinical applications.

Methodology

GS measurement of maximal voluntary effort can predict physical function of the upper body using the proxy of a series of right and left handgrip strength tests with a digital or dial hydraulic handgrip dynamometer. GS correlates with upper extremity function in nutritional impairment and is used to assess overall body strength and relationships with various health issues such as nutrition status (11). The test is a measure of active muscular contraction of both intrinsic and extrinsic hand muscles (14). Specific methodology, including patient position, examiner position, procedure, and equipment technique using a calibrated dynamometer, is critical to obtain accurate results for a clinical assessment (11).

The ASHT recommends recording a rapid exchange of three alternating-hand sequential measurements, with the means (average for each hand of three alternating readings, for a total of six readings taken in prompt alternating sequence) calculated manually or read on the dynamometer. The duration of the grip should be at least 3 seconds. The dynamometer reading stops at the maximum force applied by the hand. The patient should exhale during the grip. At least 15 seconds should elapse between alternating hands, called a "rapid exchange," to allow for recovery from muscle fatigue and to avoid patient malingering and submaximal effort (11). It is not necessary to correct for hand dominance because this effect varies substantially among users (11). Malnourished patients do not recover rapidly and, therefore, may have declining results with the test sequence of each hand.

(Continued on next page)

ASHT Grip Strength Methodology

The American Society of Hand Therapists (www.asht.org) has given permission to publish the methodology to be used with the JAMAR® and JAMAR® Plus+. See original text for more information (11). These recommendations are for these specific devices, which are considered the "gold standard." This methodology does not apply to other dynamometers or devices.

Positioning of the Person

- The client should be in a seated position (not a standing position).
- The client should be comfortably seated in a chair without arm rests, with feet fully resting on the floor, hips as far back in the chair as possible, and the hips and knees positioned at approximately 90 degrees.
- The gripping arm should be in the following position: the shoulder adducted, the elbow flexed at 90 degrees, and the forearm and wrist in a neutral position.
- The wrist should be positioned between 0 and 30 degrees extension (dorsiflexion) and between 0 and 15 degrees of ulnar deviation. The varied ranges are recommended due to a controversy in literature regarding wrist posture.
- To avoid muscle substitution patterns and ensure shoulder adduction, it is recommended that clients hold a small block between the upper arm of the gripping hand and the lateral thorax. *(Author note: in practice, this is not often done.)*
- During testing, clients should be reminded to maintain their position and should be corrected as needed.

Positioning of the Dynamometer

- The second dynamometer handle position should be used.
- The dynamometer should be placed in the client's hand by the examiner, who should gently support the base of the instrument to prevent accidental dropping.
- Grip force should be applied smoothly, without rapid wrenching or jerking motion.
- No visual or auditory feedback should be provided; thus, the dynamometer's dial should be turned away from clients so they cannot see the display. *(Author note: this step is critical for occupational therapists who assess for disability and insurance coverage; this may not be as critical for testing for malnutrition, although it is a recommended practice to avoid patient malingering.)*

Instructions:

Because instructions influence performance on evaluation tests, standardized instructions have been used in research studies examining reliability and validity of grip strength testing. The ASHT has recommended the use of standardized testing instructions but has not previously provided specific instructions, with the exception of instructing the client to maximally grip the handle of the dynamometer. To ensure consistency, clients should not be coached or encouraged during grip testing and only standardized verbal directions should be given. Thus, the examiner should provide appropriate verbal instruction. Suggested standardized instructions include: "This test will tell me your maximum grip strength. When I say go, grip as hard as you can until I say stop. Before each trial, I will ask you 'Are you ready?' and then tell you 'Go.' Stop immediately if you experience any unusual pain or discomfort at any point during the testing. Do you have any questions? Are you ready? Go!" Then as the client begins to squeeze, the examiner should say: "Harder….harder…harder…Relax." The examiner should tell the client to relax when the dial of the dynamometer levels off and starts to drop, after approximately 3 to 5 seconds of gripping.

Reprinted with permission from Schectman O, Sindhu BS. Grip assessment. In: MacDermid J, ed. *Clinical Assessment Recommendations.* 3rd ed. Mount Laurel, NJ: American Society of Hand Therapists; 2015:1–8.

The averages (mean) of each hand are compared to the appropriate age-sex-hand normal references range, including the age-sex-hand mean, and compared to minus two standard deviations (-2SD) below the mean. The comparison is typically made to a reference chart included in the documents that accompany the specific dynamometer equipment. For example, the chart supplied with the JAMAR® (11) has reference readings for ages 6 to 74 years. Bohannen et al (15) has completed a meta-analysis of GS data for individuals ages 75 to 99 years. Patient means (averages) that are -2SD or more beyond the mean for their age, sex, and hand may suggest severe PCM (8). Up to plus or minus (±) 2SD of the mean is considered within normal range. Patient results should be recorded, compared, and documented in the health record and factored in with other objective and subjective data for a clinical assessment. (Note: Bohannon and associates (15,16) use measures below the 95th percentile confidence interval, an interpretation that is not discussed in this article but is an alternate interpretive method typically used in research.)

Clinical Use of Grip Strength

The European Working Group includes GS as one measure for consideration of the diagnosis of sarcopenia in its consensus definition and criteria (17). The Foundation for the National Institutes of Health Biomarkers Consortium Sarcopenia Project used data (not consensus) from community dwelling elders and recommends cut-points for grip strength for application to sarcopenia (2,18). The Centers for Disease Control and Prevention recognized sarcopenia as an ICD-10-CM diagnosis code (M62.84) in October 2016 (2). Cut-points and application vary between the use of GS for PCM and for sarcopenia, and there are no international consensus criteria for sarcopenia at present. However, substantial effort is being devoted to this topic due to the significant impact of sarcopenia in international populations (16).

GS was selected as one of the clinical characteristics in the Academy/A.S.P.E.N 2012 *Consensus* statement due to the historic

strong presence of GS testing in literature related to PCM. In addition, the Malnutrition Workgroup for the Academy/A.S.P.E.N recognized that a functional parameter for nutrition assessment was necessary to make the nutrition-focused physical examination comprehensive (personal communication). At the time of publication of the statement, GS was considered to have a stronger literature base over other functional tests implicating PCM. GS examination is considered a realistic, inexpensive, and practical test that can be performed without patient discomfort in typical settings such as hospitals and clinics. Finally, GS does not rule out use of other examinations and tests to address patient functional ability related to nutritional status. GS may be used in conjunction with other measures of functional ability such as the sit-to-stand test or 6-minute walk (3,10).

The GS examination is noninvasive and provides objective measurements in pounds or kilograms of isometric grip force to determine normal range values or a deficit when the patient exerts maximal effort with a calibrated dynamometer. This proxy measure is related to both muscle mass and force correlated with PCM and other health-related and non-health-related variables and conditions (11). GS is not a test that independently differentiates patients who have or do not have a nutrition diagnosis of PCM (11). The Malnutrition Workgroup and authors of the Academy/A.S.P.E.N *Consensus* statement noted that the clinical characteristics of PCM could change with more research and with the development of improved, cost-effective measures of lean body mass and other clinical and functional measures (1). Therefore, GS, as with much of clinical nutrition practice, requires professional judgment, monitoring of individual patient trends, consideration of the validity of the information received, interpretation of objective and subjective information, an understanding of fuel metabolism and muscle function, and familiarity with disease and the nutritional impact of specific disease states.

According to the *Consensus*, when GS is performed, the averaged result of -2SD below the mean or beyond for age-sex-hand is an indicator of negative nutritional status and potential severe PCM in the setting of a complete nutritional assessment. Of note, the GS characteristic in the *Consensus* terminology, "measurably reduced," pertains to the category of severe acute, chronic, and starvation types of PCM, not because GS should not be measured for mild or moderate PCM, but because -2SD presently only differentiates a severe level of PCM from the normal range for age, sex, and hand (1). As noted previously, results between the mean and ±2SD are "within normal range." Reference data to differentiate moderate from mild or severe malnutrition are inadequate at present. Sequential measurements of an individual patient are also meaningful and can assist in clinical judgment. Patients with known deficits due to injury or other conditions in one or both hands and arms can still perform the examination and serve as their own "normal." Results for use in the diagnosis of sarcopenia may differ from results and interpretation for PCM (1,18,19).

Benefits

Diagnosing PCM remains a challenge. As with much in medicine, information received from patients, family, and health care professionals and as determined in a nutrition assessment by an RDN is not often truly objective, reliable, or traceable. Professionals combine the information they are presented with as "facts," their own professional judgment, communications with colleagues, and their learned experiences to arrive at diagnostic and clinical conclusions. GS testing aligns with this approach and is an inexpensive, uncomplicated, objective examination when conducted according to ASHT methodology (11). The characteristics described in the *Consensus* statement are intended for practical bedside application and may change with time. For example, progress is being made on measuring muscle mass and attenuation using computed tomography scans, bioimpedance, and other methods (20–22). However, at present, observation, palpation, and measurement of muscle mass and fat stores in a nutrition-focused physical examination remain the most available and practical means to obtain rapid data at the bedside or in the clinic to determine a reasonable nutrition assessment, nutrition diagnosis, and treatment plan.

An example of a similar clinical challenge is the assessment of food and tube feeding intake. In non-research settings, objective intake information is determined by rather subjective means. Bedside clinicians use documentation in health records, occasional calorie count information, and dietary history from patients or family members rather than a detailed computerized nutrient analysis, food aliquot nutrient analysis, or precise recordings of weighed food. Weight change is preferably measured on a calibrated scale, although both stated and estimated weights are commonly the only data available to clinicians. Considering the available data, professionals use trended measures, cross-verification, verbal reports, and their own and others' experience and judgment to determine patient assessment. RDNs use this type of information to make nutrition diagnoses, develop nutrition interventions, and adjust their analysis and patient care plans when more objective and subjective information is obtained. At present, GS provides an opportunity for objective measurements when used consistently by trained and competent RDNs.

The Academy/A.S.P.E.N. *Consensus* statement recommends use of a minimum of two clinical characteristics to make the nutrition diagnosis of PCM (1), and GS results can be one of those two described characteristics. However, in practice, GS can be useful as an additional characteristic because RDNs tend to perform the test routinely or sporadically for patients in whom weight loss, poor intake, and reduced muscle mass or fat stores already is known. Such patients may be those identified as at nutritional risk, those losing large amounts of protein via drains or fistulas, or those receiving inadequate

(Continued on next page)

intake. In addition, patients with complex medical, surgical, and treatment histories who are not progressing as expected may be routine candidates for GS. GS is an option for patients who are unable to provide clear nutrition or weight histories, for those in whom there may be problems with language translation or speech difficulties, those who lack medical records, or for families or patients asking about measures for patient progress. Many health care institutions recommend documentation of as many clinical characteristics as possible to create a solid clinical case for the diagnosis of PCM and to decrease the risk of regulatory compliance audits related to coding and reimbursement.

Situations where GS findings are inconsistent or conflict with the other *Consensus* characteristics for PCM are not often reported in professional publications. An example of this conflict related to GS would be when all other clinical characteristics suggest a nutrition diagnosis of severe PCM but GS results are between -1 SD and -2 SD below the mean (considered within normal range). Rather than creating a perceived conflict with the diagnosis of severe PCM, such results could serve as a baseline measurement for future evaluation, contribute to the general knowledge of the patient's condition at a specific point in time, and be used for comparison with new results. The GS findings should be documented and may be included or excluded as a clinical characteristic of PCM for a particular patient. The clinician should judge if the patient is severely or moderately malnourished based on clinical results of the entire nutrition assessment, with GS results potentially increasing, decreasing, or not influencing the coded severity of the PCM diagnosis. Declining nutritional status occurs over time, and cut-points and data do not often fit perfectly at a single point in time. Therefore, ongoing patient care, experience, clinical judgment, and repeat examination and analysis remain critical for integration of GS results into clinical practice.

Repeat GS testing depends on the health care setting, although once per week for patients in an acute-care setting is practical because it allows for intervention activities. Longer time frames in settings such as long-term care may be appropriate. Treatment clinics such as radiation oncology or eating disorder programs may find the examination useful at the beginning and end of treatment. There is value for future clinicians to see historical records when conducting their own nutritional evaluation. In all of these situations, consistent methodology is critical for meaningful clinical results and historical comparisons.

Contraindications

There are few contraindications to GS examination. Organizations should determine their own policy for the interval between the determination of hand injury and surgical procedures. Typically, patients are not considered injured by 8 to 10 weeks after arm or hand surgery or when released from the surgeon's care. Testing does not exacerbate arthritis. Patients are not asked to squeeze to a painful level and are told not to squeeze if it hurts. Patients may be tested on one hand and not the other. Patients should be asked permission to have a GS examination performed, and documentation of permission is suggested, as with other procedures. Some neuromuscular, neurologic, or anatomic conditions may preclude meaningful results for nutrition purposes unless normative tables are available for that specific population (11).

GS is performed for very different purposes by occupational therapists (OTs) or physical therapists (PTs) than for nutrition assessment. In fact, GS testing may be contraindicated for patients in whom these other professionals would perform an examination. OTs and PTs usually measure trends for persons with hand or arm injuries, assess neurologic deficit patterns, and measure progress or decline. These conditions may rule out GS testing for evaluation for PCM, depending on the nature of the hand or arm injury or other deficit. Therefore, GS results reported by OTs and PTs may not be useful for nutritional purposes. For example, such results would not be useful to the RDN if the OT reported results each week immediately after shoulder, arm, or hand surgery. Verification of standardized methodology is also critical if the RDN intends to use data provided by the OT or PT. If the GS methodology is identical and the patient is appropriate, the OT or PT result could be used as the basis for charting trends.

Future

In this author's opinion, a number of activities could support increased use of GS examination in clinical practice:

1. Agreement by national organizations on an accepted, standardized protocol and methodology for GS testing specific for PCM would ensure aligned practices, methodology, procedures, and results interpretation for consistency among examiners.
2. Training modules are needed for clinicians and for dietetic interns and undergraduate nutrition programs to ensure a common standardized method.
3. Professional experience and application of GS examination for specific disease populations and in specific care settings of clinical nutrition practice can differentiate populations and enhance use and appropriate clinical interpretation.
4. Handgrip strength testing provides a new opportunity for patient communication, health message teaching, and connecting the impact of the patient's nutrition intake on his or her strength, functional abilities, and recovery from illness.
5. In appropriate clinic and treatment settings, GS measurement creates an opportunity to measure pre- and post-treatment results for patient improvements or declines in functional status that may be connected to nutritional status.
6. Identification of disease-specific or setting-specific population-normalized

(Continued on page 12)

Tips and Tricks

Following are practical considerations in the operational management of grip strength (GS) examinations and equipment. These tips are based on collaboration with an occupational therapist certified in hand therapy and the author's experience in training others.

1. Assure that the dynamometer is set to pounds (typical in the United States) or kilograms. Assure that the pounds or kilogram reference norms chart matches the dynamometer setting and are for the correct sex and hand. Sarcopenia measures may be kilograms or pounds, so be aware of the pounds or kilogram setting on the digital dynamometer and the area read on the dial dynamometer.

2. Monitor (or "spot") the patient to make sure the arm remains at 90-degree angle and does not push forward or angle outward during the grip. If patient is frail, the examiner may want to keep a hand under the dynamometer or have the patient wear the hand strap to avoid dropping it and injuring the patient or examiner.

3. Completion of a worksheet before meeting with the client allows for easy and accurate referencing of normal results for the correct age, sex, and hand. A worksheet is included in the toolkit.

4. Typically, a patient who can benefit from the GS examination will have been in discussion with the registered dietitian nutritionist about his or her nutritional status and diet or have undergone a nutrition-focused physical examination for fat, muscle, and micronutrient assessment. It can be useful or appropriate to talk with the patient about GS during the course of other discussions and make an appointment for examination at another time as a separate event. The examiner can reflect on that discussion at the time of the test. Example: *"We have been chatting about your nutrition and working to improve your diet and strength. Do you recall I mentioned we can have you complete a handgrip strength test? Is now a good time for me to get a baseline measure?"*

5. Assure that rehabilitation or other physical event does not occur before the time of the examination, which can confound results due to previous muscle use or exhaustion.

6. Have writing utensils and paper at hand during the examination.

7. Ask permission and consider documenting others present for the examination.

8. Route newly purchased equipment through biomedical engineering for approval and item code labels before releasing it for use to clinicians. Some engineering departments may affirm that annual calibration may not be necessary and that calibration may be performed in-house rather than annually mailing to manufacturer. An approach to verify the best approach with your biomedical engineering department to periodically calibrate the equipment internally may be appropriate given the inherent risk in mailing and costs of recalibration with the manufacturer.

9. Testing approaches and culture vary among health systems, geographic locations, and clinicians. The author has found that patients enjoy the experience and are highly engaged in learning their results, which provides an excellent opportunity to teach about the relationships between diet, strength, and healing. A partnership approach, rather than a distant attitude in the person conducting the examination, is conducive to learning and can help motivate patients to improve their diets and reflect on progress being made in healing due to improved intake. Conducting the examination at eye level rather than having the examiner stand, looking down upon the patient, is a positive and professional approach. Separate any teaching from the actual examination to retain objectivity.

10. Report results to the patient thoughtfully. Examples:

    "This gives us a good baseline measure today. You are toward the low end of the normal range (a bit low, low, within normal, above the normal, etc.). You are working hard to eat the snacks and meals we have set up, so you're on the right track."

    "I will take the results of the test today and put them together with some other results for my evaluation. We have a good plan in place for your nutrition, so we will work on that, and we can take another measure next week."

11. Greet the patient and introduce yourself. Upon completion of the examination, thank the patient and any family members present.

12. When setting up the patient for the examination, ensure that he or she is seated safely and will not slide off the side of the bed. Patients can be positioned in bed, with the back of the bed elevated to as close to 90 degrees as able and legs straight out front; sit on the side of the bed straight up with feet on floor; or sit in a chair straight up as possible, with feet on the floor. Pillows can be used behind the patient's back. Examiners may need assistance from another person such as a nurse to verify a safe position for the patient.

13. Some digital dynamometers auto-calculate the mean of the three measures on each hand. However, we recommend setting the dynamometer for four right hand/left hand tests, manually recording each measure, and then manually calculating the average for each hand. If the dynamometer is set to three right hand/left hand measures, and the client or tester fumbles and causes a misread, that result would not be useable but could be included in the auto-calculation, thus distorting the true result. The dynamometer may have the ability to exclude a reading, but resetting and adjusting can delay the examination and easily confuse the examiner on the timing and pattern of the hand sequence exchange.

14. At the first measurement, clients are naive to the test. Holding and handling the dynamometer and demonstrating correct positioning can increase patient familiarity and reduce hesitancy to encourage maximal grip effort. Let the client hold and slightly squeeze the dynamometer to see how it does not move and feel the weight in the hand. However, the client should not squeeze with power because that uses muscle and fuel, thereby affecting true results. If squeezes improve with the three tests on a hand, the client likely has gained confidence or wanted to perform for the examiner or audience. This is one reason that three measures and the mean on each hand are recommended by the American Society of Hand Therapists. The problem is not evident after the first examination event because the patient is no longer naive to the methodology or dynamometer.

15. Pack an extra set of batteries and sanitary wipes in the case holding the equipment. Clean the dynamometer in the presence of the client, using an approved sanitary wipe, before starting and after completing the examination.

16. Keep a copy of the reference set of norms and worksheets in the case with the equipment. If more than one dynamometer is in the office, make sure they reside in the correctly labeled cases that were authorized by the biomedical engineers.

17. The movable handle on the Jamar® Plus+ digital and Jamar® dial dynamometer should be at the second slot position from the long side. Rarely, a very small-handed person or a very large-handed person may require the handle to be at the first or third position setting, respectively. Such positions are very rarely needed; most persons even of small or large hand size hold the dynamometer correctly at the second setting. Moving the handle repeatedly may not be ideal for dynamometers because screws are involved in handle positioning. The hand position should not involve holding on with the fingertips or the hand wrapping so far around the handle that the fingers and hand touch.

18. Often health care organizations have contracts for rehabilitation equipment that can reduce the cost of the unit over buying online. Some manufacturers offer volume discounts. Check with the buyer of rehabilitation equipment for any potential contracted price benefit.

GS reference sets is desirable if available. As noted previously, the JAMAR® and the ASHT method are considered the recommended standards. Because there are multiple devices with various reference sets for different populations, more research would be valuable to establish norms for population subsets (11). Equipment and reference sets should match the population evaluated when using various dynamometers, which is why the examiner should use the normalization tables that accompany the dynamometer used.

7. Research and quality improvement project methodology should be undertaken for GS measurement, which may differ from everyday bedside application. The discussion and references in the ASHT and elsewhere provide information about validation of the tools and normalization tables (10,11,15,18).

Equipment

RDNs must read all information on safe and accurate equipment management contained in the materials sent with the dynamometer to become familiar with equipment settings, maintenance, and sanitation. The Jamar® Plus+ digital dynamometers can be set up once and remain set. For example, if the Jamar® Plus+ is set to the 4 left/right setting, this sequence will remain until resetting the dynamometer or when the battery needs replacing.

Summary

The ASHT method for GS of maximal voluntary effort provides a standardized approach to measure a patient's functional ability that is influenced by PCM. GS assessment is a clinical characteristic of adult PCM, as described in the Academy/A.S.P.E.N. *Consensus* statement for identifying and documenting adult malnutrition (undernutrition) and is potentially a consideration in the ICD-10-CM diagnosis of sarcopenia, according to two professional groups. RDNs can use the methodology at the bedside to obtain reliable measurement results that can contribute to making a nutrition diagnosis of PCM or sarcopenia. Determination of accepted methodology by national professional organizations should benefit efforts to align clinical practices, move forward both patient care and research related to the diagnosis of PCM and sarcopenia, and provide more objective measurements of outcomes from nutrition intervention. RDN competence in GS assessment is an important skill to apply in clinical nutrition practice.

CPEU questions for this article can be accessed at dnsdpg.org.

Terese M. Scollard, MBA, RDN, LD, FAND, is Regional Clinical Nutrition Manager at Providence Health and Services, Portland, OR.

Online Access to Toolkit

Dietetic Practice Groups (DPGs) of the Academy of Nutrition and Dietetics are planning to provide online access to a prerecorded webinar, in-depth program materials, practice forms, and group training materials as a member benefit. Monitor announcements and newsletter messages from these DPGs to learn when access to the toolkit is open to members.

- Dietitians in Nutrition Support and affiliated groups https://dnsdpg.org and www.nutritioncare.org
- Clinical Nutrition Management http://www.cnmdpg.org/
- Oncology Nutrition http://www.oncologynutrition.org/
- Medical Nutrition Practice Group http://www.mnpgdpg.org/
- Healthy Aging http://www.hadpg.org/

DPG members are encouraged to use the resources in the toolkit to self-train in small groups to reach competency and apply grip strength examination in clinical practice as well as teach future Registered Dietitian Nutritionists and Nutrition and Dietetic Technicians Registered these skills. Such training can aid in improving the identification, documentation, diagnosis, and prompt intervention of patients with protein-calorie malnutrition.

Three continuing professional education credit hours have been applied for from the Commission on Dietetic Registration for completion of the entire program.

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NORMATIVE GRIP STRENGTH DATA: FEMALES (lbs)

AGE	HAND	MEAN	SD	2xSD	ALERT LEVEL
6-7	R	28.6	4.4	8.8	**19.8**
	L	27.1	4.4	8.8	**18.3**
8-9	R	35.3	8.3	16.6	**18.7**
	L	33.0	6.9	13.8	**19.2**
10-11	R	49.7	8.1	16.2	**33.5**
	L	45.2	6.8	13.6	**31.6**
12-13	R	56.8	10.6	21.2	**35.6**
	L	50.9	11.9	23.8	**27.1**
14-15	R	58.1	12.3	24.6	**33.5**
	L	49.3	11.9	23.8	**25.5**
16-17	R	67.3	16.5	33.0	**34.3**
	L	56.9	14.0	28.0	**28.9**
18-19	R	71.6	12.3	24.6	**47.0**
	L	61.7	12.5	25.0	**36.7**
20-24	R	70.4	14.5	29.0	**41.4**
	L	61.0	13.1	26.2	**34.8**
25-29	R	74.5	13.9	27.8	**46.7**
	L	63.5	12.2	24.4	**39.1**
30-34	R	78.7	19.2	38.4	**40.3**
	L	68.0	17.7	35.4	**32.6**
35-39	R	74.1	10.8	21.6	**52.5**
	L	66.3	11.7	23.4	**42.9**
40-44	R	70.4	13.5	27.0	**43.4**
	L	62.3	13.8	27.6	**34.7**
45-49	R	62.2	15.1	30.2	**32.0**
	L	56.0	12.7	25.4	**30.6**
50-54	R	65.8	11.6	23.2	**42.6**
	L	57.3	10.7	21.4	**35.9**
55-59	R	57.3	12.5	25.0	**32.3**
	L	47.3	11.9	23.8	**23.5**
60-64	R	55.1	10.1	20.2	**34.9**
	L	45.7	10.1	20.2	**25.5**
65-69	R	49.6	9.7	19.4	**30.2**
	L	41.0	8.2	16.4	**24.6**
70-74	R	49.6	11.7	23.4	**26.2**
	L	41.5	10.2	20.4	**21.1**
75+	R	42.6	11.0	22.0	**20.6**
	L	37.6	8.9	17.8	**19.8**

Adapted from 4/2015 Jamar®Plus Hand Dynamometer for Patterson Medical®(Hydraulic)

NORMATIVE GRIP STRENGTH DATA: MALES (lbs)

AGE	HAND	MEAN	SD	2xSD	ALERT LEVEL
6-7	R	32.5	4.8	9.6	**22.9**
	L	30.7	5.4	10.8	**19.9**
8-9	R	41.9	7.4	14.8	**27.1**
	L	39.0	9.3	18.6	**20.4**
10-11	R	53.9	9.7	19.4	**34.5**
	L	48.4	10.8	21.6	**26.8**
12-13	R	58.7	15.5	31.0	**27.7**
	L	55.4	16.9	33.8	**21.6**
14-15	R	77.3	15.4	30.8	**46.5**
	L	64.4	14.9	29.8	**34.6**
16-17	R	94.0	19.4	38.8	**55.2**
	L	78.5	19.1	38.2	**40.3**
18-19	R	108.0	24.6	49.2	**58.8**
	L	93.0	27.8	55.6	**37.4**
20-24	R	121.0	20.6	41.2	**79.8**
	L	104.5	21.8	43.6	**60.9**
25-29	R	120.8	23.0	46.0	**74.8**
	L	110.5	16.2	32.4	**78.1**
30-34	R	121.8	22.4	44.8	**77.0**
	L	110.4	21.7	43.4	**67.0**
35-39	R	119.7	24.0	48.0	**71.7**
	L	112.9	21.7	43.4	**69.5**
40-44	R	116.8	20.7	41.4	**75.4**
	L	112.8	18.7	37.4	**75.4**
45-49	R	109.9	23.0	46.0	**63.9**
	L	100.8	22.8	45.6	**55.2**
50-54	R	113.6	18.1	36.2	**77.4**
	L	101.9	17.0	34.0	**67.9**
55-59	R	101.1	26.7	53.4	**47.7**
	L	83.2	23.4	46.8	**36.4**
60-64	R	89.7	20.4	40.8	**48.9**
	L	76.8	20.3	40.6	**36.2**
65-69	R	91.1	20.6	41.2	**49.9**
	L	76.8	19.8	39.6	**37.2**
70-74	R	75.3	21.5	43.0	**32.3**
	L	64.8	18.1	36.2	**28.6**
75+	R	65.7	21.0	42.0	**23.7**
	L	55.0	17.0	34.0	**21.0**

Adapted from 4/2015 Jamar®Plus Hand Dynamometer for Patterson Medical®(Hydraulic)

NORMATIVE GRIP STRENGTH DATA: FEMALES(Kgs)

AGE	HAND	MEAN	SD	2xSD	ALERT LEVEL
6-7	R	13.0	2.0	4.0	**9.0**
	L	12.3	2.0	4.0	**8.3**
8-9	R	16.0	3.8	7.6	**8.4**
	L	15.0	3.1	6.2	**8.8**
10-11	R	22.5	3.7	7.4	**15.1**
	L	20.5	3.1	6.2	**14.3**
12-13	R	25.8	4.8	9.6	**16.2**
	L	23.1	5.4	10.8	**12.3**
14-15	R	26.4	5.6	11.2	**15.2**
	L	22.4	5.4	10.8	**11.6**
16-17	R	30.5	7.5	15.0	**15.5**
	L	25.8	6.4	12.8	**13.0**
18-19	R	32.5	5.6	11.2	**21.3**
	L	28.0	5.7	11.4	**16.6**
20-24	R	31.9	6.6	13.2	**18.7**
	L	27.7	5.9	11.8	**15.9**
25-29	R	33.8	6.3	12.6	**21.2**
	L	28.8	5.5	11.0	**17.8**
30-34	R	35.7	8.7	17.4	**18.3**
	L	30.8	8.0	16.0	**14.8**
35-39	R	33.6	4.9	9.8	**23.8**
	L	30.1	5.3	10.6	**19.5**
40-44	R	31.9	6.1	12.2	**19.7**
	L	28.3	6.3	12.6	**15.7**
45-49	R	28.2	6.8	13.6	**14.6**
	L	25.4	5.8	11.6	**13.8**
50-54	R	29.8	5.3	10.6	**19.2**
	L	26.0	4.9	9.8	**16.2**
55-59	R	26.0	5.7	11.4	**14.6**
	L	21.5	5.4	10.8	**10.7**
60-64	R	25.0	4.6	9.2	**15.8**
	L	20.7	4.6	9.2	**11.5**
65-69	R	22.5	4.4	8.8	**13.7**
	L	18.6	3.7	7.4	**11.2**
70-74	R	22.5	5.3	10.6	**11.9**
	L	18.8	4.6	9.2	**9.6**
75+	R	19.3	5.0	10.0	**9.3**
	L	17.1	4.0	8.0	**9.1**

Adapted from 3/2015 Jamar®Plus Hand Dynamometer for Patterson Medical®(Hydraulic)

NORMATIVE GRIP STRENGTH DATA: MALES (Kgs)					
AGE	**HAND**	**MEAN**	**SD**	**2xSD**	**ALERT LEVEL**
6-7	R	14.7	2.2	4.4	**10.3**
	L	13.9	2.4	4.8	**9.1**
8-9	R	19.0	3.4	6.8	**12.2**
	L	17.7	4.2	8.4	**9.3**
10-11	R	24.4	4.4	8.8	**15.6**
	L	22.0	4.9	9.8	**12.2**
12-13	R	26.6	7.0	14.0	**12.6**
	L	25.1	7.7	15.4	**9.7**
14-15	R	35.1	7.0	14.0	**21.1**
	L	29.2	6.8	13.6	**15.6**
16-17	R	42.6	8.8	17.6	**25.0**
	L	35.6	8.7	17.4	**18.2**
18-19	R	49.0	11.2	22.4	**26.6**
	L	42.2	12.6	25.2	**17.0**
20-24	R	54.9	9.3	18.6	**36.3**
	L	47.4	9.9	19.8	**27.6**
25-29	R	54.8	10.4	20.8	**34.0**
	L	50.1	7.3	14.6	**35.5**
30-34	R	55.2	10.2	20.4	**34.8**
	L	50.1	9.8	19.6	**30.5**
35-39	R	54.3	10.9	21.8	**32.5**
	L	51.2	9.8	19.6	**31.6**
40-44	R	53.0	9.4	18.8	**34.2**
	L	51.2	8.5	17.0	**34.2**
45-49	R	49.8	10.4	20.8	**29.0**
	L	45.7	10.3	20.6	**25.1**
50-54	R	51.5	8.2	16.4	**35.1**
	L	46.2	7.7	15.4	**30.8**
55-59	R	45.9	12.1	24.2	**21.7**
	L	37.7	10.6	21.2	**16.5**
60-64	R	40.7	9.3	18.6	**22.1**
	L	34.8	9.2	18.4	**16.4**
65-69	R	41.3	9.3	18.6	**22.7**
	L	34.8	9.0	18.0	**16.8**
70-74	R	34.2	9.8	19.6	**14.6**
	L	29.4	8.2	16.4	**13.0**
75+	R	29.8	9.5	19.0	**10.8**
	L	24.9	7.7	15.4	**9.5**

Adapted from 4/2015 Jamar®Plus Hand Dynamometer for Patterson Medical®(Hydraulic)

FEMALE 75 Years PLUS Grip Strength: results of Meta-Analysis of GS data Journal Geriatric Physical Therapy Vol. 30;1:07 p 28-30				"Alert" level inferred from data
FEMALE POUNDS				
Age Group	**Side**	**Mean (95% CI)**	**Range Normal**	**"Alert" Level**
75-79	Right	47.6	40.9-54.2	40.8
	Left	42.5	35.5-49.4	35.4
80-84	Right	38.2	32.6-43.8	32.5
	Left	37.6	31.9-43.3	31.8
85-89	Right	37.7	28.3-47.1	28.2
	Left	34.6	26.9-42.3	26.8
90-99	Right	33.6	25.3-42.0	25.2
	Left	32.6	24.6-40.5	24.5

FEMALE 75 Years PLUS Grip Strength: results of Meta Analysis of GS data Journal Geriatric Physical Therapy Vol. 30;1:07 p 28-30				"Alert" level inferred from data
FEMALE KILOGRAMS				
Age Group	**Side**	**Mean (95% CI)**	**Range Normal**	**"Alert" Level**
75-79	Right	21.6	18.6-24.6	18.5
	Left	19.3	16.1-22.4	16
80-84	Right	17.3	14.8-19.9	14.7
	Left	17.1	14.5-19.6	14.4
85-89	Right	17.1	12.8-21.4	12.7
	Left	15.7	12.2-19.2	12.1
90-99	Right	15.2	11.5-19.1	11.4
	Left	14.8	11.2-18.4	11.1

MALE 75 Years PLUS Grip Strength: results of Meta Analysis of GS data Journal Geriatric Physical Therapy Vol. 30;1:07 p 28-30				"Alert" level inferred from data
MALE POUNDS				
Age Group	**Side**	**Mean (95% CI)**	**Range Normal**	**"Alert" Level**
75-79	Right	72.7	59.7-85.7	59.6
	Left	68.5	56.4-80.6	56.3
80-84	Right	66.4	53.6-79.1	53.5
	Left	59.6	49.0-70.2	48.9
85-89	Right	56.9	50.3-63.5	50.2
	Left	55.3	45.1-65.5	45.0
90-99	Right	41.5	31.1-51.9	31.0
	Left	41.6	38.3-44.8	38.2

MALE 75 Years PLUS Grip Strength: results of Meta Analysis of GS data Journal Geriatric Physical Therapy Vol. 30;1:07 p 28-30				"Alert" level inferred from data
MALE KILOGRAMS				
Age Group	**Side**	**Mean (95% CI)**	**Range Normal**	**"Alert" Level**
75-79	Right	33	27.1-38.9	27.0
	Left	31.1	25.6-36.6	25.5
80-84	Right	30.1	24.3-35.9	24.2
	Left	27	22.2-31.8	22.1
85-89	Right	25.8	22.8-28.8	22.7
	Left	25.1	20.5-29.7	20.4
90-99	Right	18.8	14.1-23.5	14.0
	Left	18.9	17.4-20.3	17.3

Hand Grip Strength Worksheet

Test Date: _____
Patient Name: _____
DOB: _____
Room Number: _____
Dynamometer set to: Pounds or Kilograms

Patient Age:	Actual: Right Hand	Actual: Left Hand	Normal Mean for this patient	Alert Level for This Patient
Gender:				
Measurement 1				
Measurement 2				
Measurement 3				
Right hand Mean				
Left hand Mean				
Patient within Norm?		Yes No		
Patient below Alert Level?		Yes No		

Instructions:

1. Before exam: locate the form using the sex-appropriate chart for patient age, dynamometer measurement preference of lbs. or kg, the normal means and alert levels for right and left hands for your patient.
2. Pre-fill-in the information in the specified space.
3. Conduct theexam alternately on each hand, recording the highest score read from dynamometer on each test for each hand. You will have 3 scores for each hand. Average and record the average score (Mean) for each hand.
4. Compare the patient's average score for each hand to the reference normal and the Alert Level. Circle "Yes" or "No" depending on if patient is within norm or below alert level.
5. Document the measurement results; Document your analysis as part of overall nutritional assessment.

PHS OR 12/29/2016

Hand Grip Strength Worksheet

Test Date: _____
Patient Name: _____
DOB: _____
Room Number: _____
Dynamometer set to: Pounds or Kilograms

Patient Age:	Actual: Right Hand	Actual: Left Hand	Normal Mean for this patient	Alert Level for this patient
Gender:				
Measurement 1				
Measurement 2				
Measurement 3				
Right hand Mean				
Left hand Mean				
Patient within Norm?		Yes No		
Patient below Alert Level?		Yes No		

Instructions:

1. Before exam: determine from gender appropriate chart for patient age, gender, dynamometer measurement preference of lbs. or kg, the normal means and alert levels for right and left hands for patient age and sex.
2. Pre-fill-in the information in the specified space.
3. Conduct the test alternately on each hand, recording the highest score read from dynamometer on each test for each hand. You will have 3 scores for each hand. Average and record the average score (Mean) for each hand.
4. Compare the patient's average score for each hand to the reference normal and the alert level. Circle "Yes" or "No" depending on if patient is within norm or below alert level.
5. Document Results. Document analysis as part of overall assessment.

Hand Grip Strength Worksheet

Sample filled out

Test Date: ____*4/7/2017*_____

Patient Name: _____*Gregory Gripstrength*____

DOB: _____*4/11/1941*_____

Room Number: ___*221B*_____

Dynamometer set to: (Pounds) or Kilograms

Patient Age: *76*	**Actual: Right Hand**	**Actual: Left Hand**	**Normal Mean for this patient**	**Alert Level for This Patient**
Gender: *M*				
Measurement 1	***29.2***	***26.3***		
Measurement 2	***26.5***	***25.4***		
Measurement 3	***22.2***	***24.7***		
Right hand Mean	***25.9***		***65.7***	***23.7***
Left hand Mean		***25.5***	***55.0***	***21.0***
Patient within Norm?		(Yes) No		
Patient below Alert Level?		Yes (No)		

Instructions:

1. Before exam: locate the form using the sex-appropriate chart for patient age, dynamometer measurement preference of lbs. or kg, the normal means and alert levels for right and left hands for your patient.
2. Pre-fill-in the information in the specified space.
3. Conduct the exam alternately on each hand, recording the highest score read from dynamometer on each test for each hand. You will have 3 scores for each hand. Average and record the average score (Mean) for each hand.
4. Compare the patient's average score for each hand to the reference normal and the Alert Level. Circle "Yes" or "No" depending on if patient is within norm or below alert level.
5. Document the measurement results; Document your analysis as part of overall nutritional assessment.

Practice Documentation: Document Handgrip Examination

Practice Chart Note: Report the Measurement Results	
Report measurement results (real, simulated or made-up). Be sure to note the details that should be present as taught. (Hint: norms, patient tolerance of exam, method used, lbs or kg of the dynamometer, type of dynamometer others present, etc.). This will help standardize for the next examiner at a future date, and assure readers know exactly what occurred and the measured results. Write real, simulated or made-up patient measurement results as preferred. (Note: some electronic medical records include flow sheets that allow reporting of each measurement from each hand; and the flow sheet also automatically calculates the mean (average) of each hand and fills in that flow sheet row location.)	
Nutrition Diagnosis: Write a PES statement of your patients overall nutritional diagnosis of some type of malnutrition, or not malnourished, including the handgrip results	
Problem: Etiology: Signs and Symptoms (Hint: HGS results will be some of the signs and symptoms)	P E S
Summary comments	
Write your analysis of the handgrip results in the context of your patient's nutritional assessment. (Will need to make-up some information). Record your evaluation and discussion of the meaning of the measurements related to the nutritional status of your patient, and your interpretation of these results. (Add other simulated or made-up information about your patient's nutritional status as needed.)	
Cross-check your practice notes with the information learned from the course to verify that you recorded the pertinent information. If missing anything, make adjustments.	All details present? Some Details missing?

Practice: Chart Documentation of Handgrip Examination and Results

Practice Chart Note: Report the Measurement Results

Report measurement results (for practice can be real, simulated or made-up).

Be sure to note the details that should be present as taught. (Hint: norms, patient tolerance of exam, method used, lbs or kg of the dynamometer, type of dynamometer others present, etc.).
This will help standardize for the next examiner at a future date, and assure readers know exactly what occurred and the measured results.

Write real, simulated or made-up patient measurement results as preferred.
(Note: some electronic medical records include flow sheets that allow reporting of each measurement from each hand; and the flow sheet also automatically calculates the mean (average) of each hand and fills in that flow sheet row location.)

December 4, 2016 10:00 a.m.
Hand Grip Strength Examination

Readings in pounds force	Mean	Normal mean for age and sex
30.1; 29.8; 30.0	Right hand mean 29.9	49.6 pounds
24.6; 24.2; 23.9	Left hand mean 24.2	41.0 pounds

Method: American Society of Hand Therapists, 2016.
Equipment: Jamar Plus Digital Hand Dynamometer
68 year old female
Right and left hand mean is beyond minus 2 Standard Deviations beyond the mean, and measurably reduced.
Patient Exam Position: In bed with head of bed up positioned 90 degrees with arms bent at 90 degrees.
Patient agreed to exam. Patient tolerated exam.
Also present for test: Betty Jones RN
Dietitian xx RDLD

Nutrition Diagnosis: Write a PES statement of your patients overall nutritional diagnosis of some type of malnutrition, or not malnourished, including the handgrip results

Problem:

P: Chronic disease-related malnutrition.

Etiology:

E: related to inadequate protein and energy intake in light of elevated energy and protein needs secondary to foot ulcer and radiation treatments.

Signs and Symptoms

(Hint: HGS results will be some of the signs and symptoms)

S: Recent weight loss (13%) - In last 3-4 months, lost 18 lb. Underweight (118 pounds (BMI 18.9); poor intake (less than 40-60%/day estimated daily intake 900-1100 Calories/day and 30-40 grams protein. Impaired ADL's with handgrip strength measured beyond minus 2 SD of mean for age and sex, and measurably reduced. (29.9 R hand mean; 24.2 left hand mean - Normal mean for age/sex right hand is 49.6 and left hand 41.0 lbs.).

Summary Commentary

Write your analysis of the handgrip results in the context of your patient's nutritional assessment. (Will need to make-up some information).
Record your evaluation and discussion of the meaning of the measurements related to the nutritional status of your patient, and your interpretation of these results.
(Add other simulated or made-up information about your patient's nutritional status as needed.)

Patient with 3-4 month health decline after completion of radiation therapy, including progressive inability to adequately care for self at home, chronic infection resulting in weight loss, declining food intake and general functional decline and significant weakness supported by weak handgrip results and history. Intake improving (ate 90%of breakfast and lunch) and tolerated, including high calorie/protein between-meal snacks. Patient achieving calculated energy and protein needs (goal 2000 calories, 85 grams protein/day) for recent 2 days. No signs of refeeding syndrome present.

Cross-check your practice notes with the information learned from the course to verify that you recorded the pertinent information. If missing anything, make adjustments.

All details present? yes

Some Details missing?

Sample dot phrases created for electronic health record for outpatient documentation of results
(Delete incorrect phrases and edit as needed)

.td
Hand Grip Strength Examination - American Society of Hand Therapists 2016
Equipment: Jamar Plus Digital Hand Dynamometer

Test Hand	Readings in pounds force	Mean for age and sex	Normal mean for age and sex	Alert level (minus 2 SD for age and sex)
Right Hand	***; ***; ***;	***	*** pounds	
Left Hand	***; ***; ***;	***	*** pounds	

*Right and left hand mean is more than minus 2 Standard Deviations beyond the mean and measurably reduced.
*Right and left hand mean is within 2 Standard Deviations from the mean and is within normal range.
*Right hand mean is more than minus 2 Standard Deviations from the mean and measurably reduced.
*Left hand mean is within than 2 Standard Deviations from the mean and within normal range.

Patient Position:
Seated straight up in chair with arms bent at 90 degrees.
Patient agreed to exam.
Patient tolerated exam.
Also present for exam ***

Options for results reporting:

Right and left hand mean is within 2 Standard Deviations from the mean and is within normal range.
Right hand mean is within 2 Standard Deviations from the mean and within normal range.
Left hand mean is within 2 Standard Deviations from the mean and within normal range.

Right and left hand mean is beyond minus 2 Standard Deviations beyond the mean and measurably reduced.
Right hand mean is beyond minus 2 Standard Deviations from the mean and measurably reduced.
Left hand mean is beyond minus 2 Standard Deviations from the mean and measurably reduced.

Right and left hand mean are within normal range for age and sex, but trending towards minus 2 standard deviations beyond the mean.
Right hand mean is within normal range for age and sex, but trending towards minus 2 standard deviations beyond the mean.
Left hand mean is within normal range for age and sex, but trending towards minus 2 standard deviations beyond the mean.

Hand Grip Strength Competency: "Spotter" checklist

Date:

"Spotter" monitors "Patient" and "Examiner" to assure strict methodology and patient safety.

Roles change during training; complete minimum of 3 roles each to get comfortable.

"Patient" _____

"Examiner" _____

"Spotter" _____

Patient position (seated in chair):

- ☐ Patient is safe in selected position (chair, side of bed, in bed).
- ☐ Torso at 90 degrees to legs (if in bed, get as close to 90 degrees as reasonable with legs out front).
- ☐ Arm bent 90 degrees at elbow with upper arm parallel to torso (not pushing forward or elbow sticking out).
- ☐ Shoulders in relaxed position, not scrunched up to neck; do not throw shoulder forward to squeeze.
- ☐ Feet straight forward and on floor if possible; consider footstool or other chair if feet not on floor.
- ☐ Patient sitting up straight, not slouching.
- ☐ Elbows not resting on chair arms.
- ☐ Dynamometer in correct position, so readout is facing examiner, not patient.

Examiner:

- ☐ Position directly facing patient, not to side, preferably at same eye level to assure patient is in right position and not tower over patient.
- ☐ Once dynamometer is given to patient, gently put hand underneath (so it does not drop on patient) until assured of correct position and safe hold of the dynamometer and patient. (Use strap on patient wrist if unsure).
- ☐ Hold dynamometer at top and bottom to give to patient in correct position, verify settings.
- ☐ Writing utensil, form and a place to write is reachable by examiner if examiner is recorder of results.
- ☐ Pre-populate worksheet data with patient data and normal and alert levels for right and left hand.

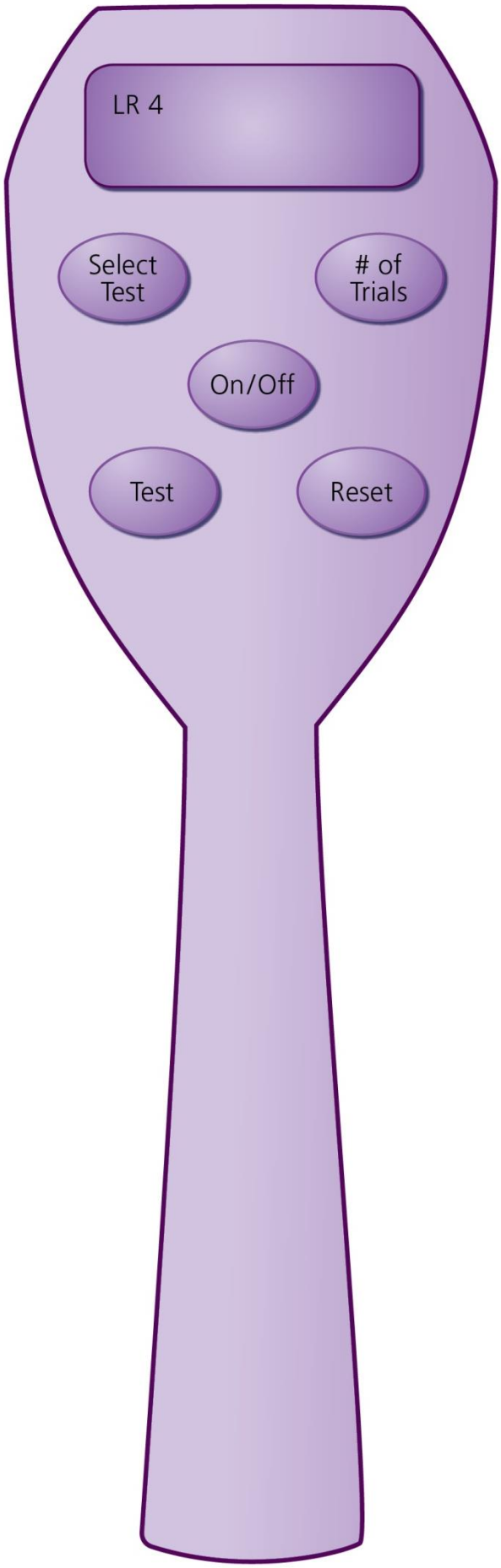
Spotter:

- ☐ Monitor and check examiner to assure patient instructed per the methodology, including introductions, sanitizing and orientating patient to the examination.
- ☐ Watch closely if patient moves from correct position when being tested, for example scrunching up shoulders, moving elbow from parallel to torso or midline, pushing hand and arm out during the squeeze and throwing shoulder forward during the squeeze. Make sure examiner corrects patient.
- ☐ Check examiner for position.
- ☐ Check patient for position.
- ☐ Observe and complete this checklist.
- ☐ Give feedback to examiner afterwards.
- ☐ Did examiner instruct patient per methodology?
- ☐ Did examiner assure patient safety in not dropping the dynamometer or slipping off side of bed.
- ☐ Did examiner fill out work form correctly and interpret correctly?

Pattern for Simulated Dynamometer

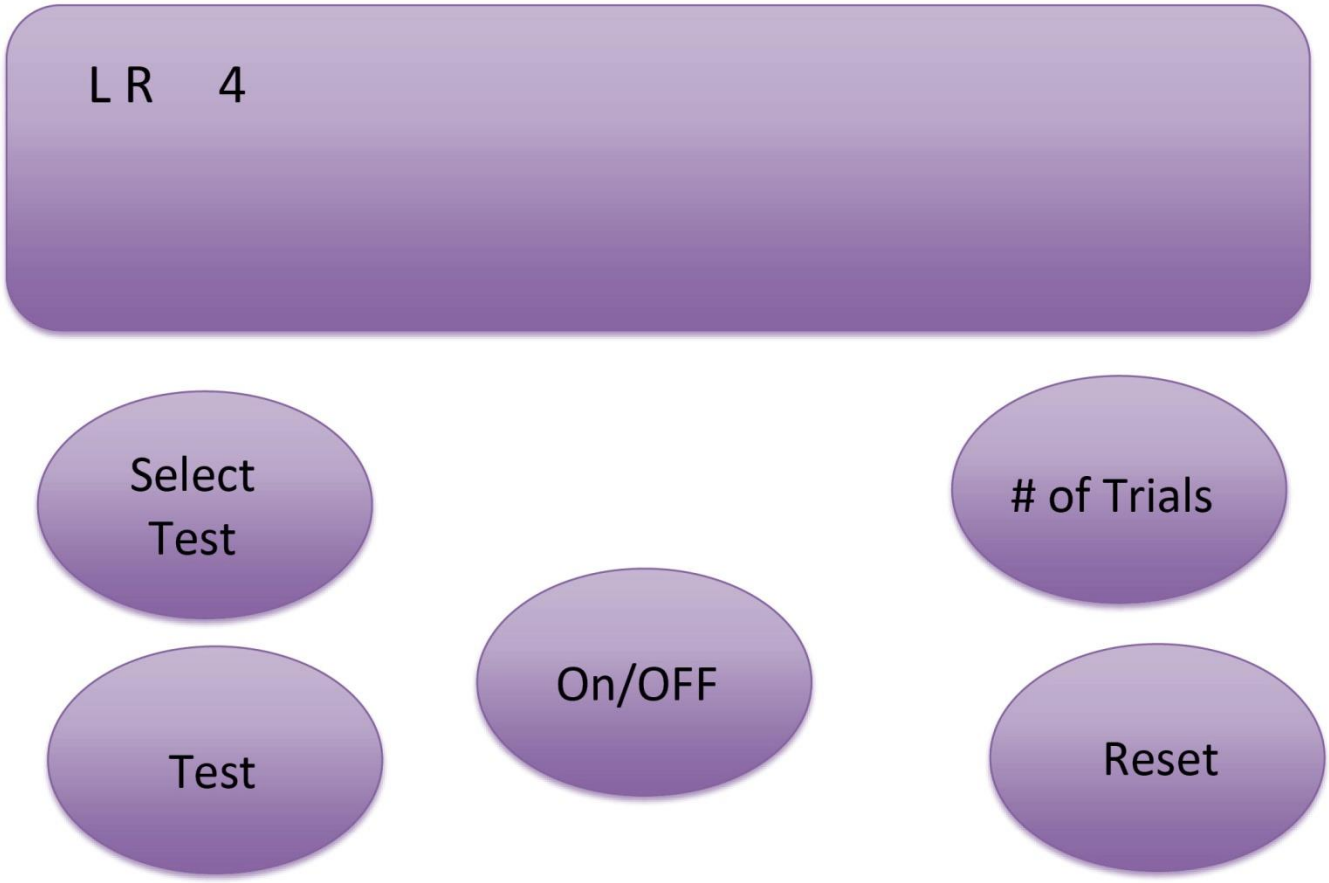
Instructions:

- Cut out on foam core or cardboard.
- Use for practice in positioning patient and examiner.



Practice Dynamometer Buttons

Refer to equipment instructions



Practice Dynamometer Readings:
Worksheet Calculations and Results Reporting in POUNDS (lbs.)

Simulated data to practice hand grip interpretation, calculating means, determining alert level comparison and for practice documentation.

Male 76 years old

Right Hand	29.2	26.5	22.2
Left Hand	26.3	25.4	24.7

Male 37 years old

Right Hand	120.4	125.5	126.2
Left Hand	115.8	116.4	115.1

Male 56 years old

Right Hand	66.2	62.4	56.3
Left Hand	48.7	36.6	35.2

Female 76 years old

Right Hand	24.4	20.2	19.5
Left Hand	20.1	18.6	17.7

Female 60 years old

Right Hand	36	33	31
Left Hand	32	28	25

Female 38 years old

Right Hand	85	89	91
Left Hand	68	70	73

Female Child 9 years old

Right Hand	20	15	13
Left Hand	18	13	10

Female Child 15 years old

Right Hand	61	57	55
Left Hand	52	49	45

Male Child 9 years old

Right Hand	27	24	22
Left Hand	21	18	15

Male Child 15 years old

Right Hand	78	80	82
Left Hand	66	63	61

Sample:
Request for Electronic Healthcare Record Optimization to include Grip Strength in flow sheet:

Problem Statement **(Note: not what you want built in EHR, but what clinical / operational / financial problem are you trying to solve):**

Grip strength for the purpose of nutritional assessment is one of the clinical characteristics of adult malnutrition. The Occupational Therapists have an outpatient field called "OP HAND." The inpatient and outpatient dietitians request these flow sheet fields in order to consistently document the results they find on patients that are being assessed for protein calorie malnutrition.

Currently, hand grip dynamometry performed for the purpose of nutritional assessment by the dietitians can only be free-text into Notes. There is considerable value to see patterns of grip strength in a flow sheet format for the purpose of assisting in the nutritional assessment for the purpose of documenting patient status and potential malnutrition and for monitoring patient progress over time.

Proposed Solution **(If you have a recommendation on how to address the problem):**

Please allow "OP HAND" or renamed version of "OP HAND" (OP-HAND-NUTRITION"? to be able to be wrenched into the Dietitians Nutritional Assessment to record measured data in both inpatient dietitians and outpatient dietitian EHR access. This data is then incorporated into a complete nutritional assessment and reassessments, and followed over time in the flow sheet format. Results are part of the data that supports nutrition dx of malnutrition and potential patient recovery.

Requester's Clinical Title/Role **(Affected End User):**
XXXXX RDN

Need Assessment **(LOW-HIGH):**
Patient Safety: Low
Quality: High
Community Impact: Moderate
Usability & Adoption: High/Medium
Compliance **(Please cite the regulation if ranked high importance): Low.** no regulation: but is best practice and supports system-wide initiatives to identify and document protein calorie malnutrition for the purpose of patient care, transition care and potential inpatient and ambulatory reimbursement from payers who pay in the DRG MS system. If an audit should occur, the data better-supports evidence of compliance with regulatory and national standards for adequate evidence of severe, moderate or mild protein-calorie malnutrition.
Revenue: None direct, however indirectly can influence the diagnosis of severe protein calorie malnutrition which is an MCC and contributes to reimbursement and severity of illness scores, when part of a complete nutritional assessment by a registered dietitian.

Needs Assessment (Low to High Description)

Scollard TM. Handgrip strength assessment: a skill to enhance diagnosis of disease-related malnutrition. Support Line. 2017;39(2):7-13

White J V, Guenter P, Jensen G, et al. Consensus statement: Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition: characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *JPEN J Parenter Enter Nutr*. 2012;36(3):275-283. http://www.ncbi.nlm.nih.gov/pubmed/22535923.

References available upon request.

(Continued: scoring for optimization request)

Definitions:

Safety	Low: reduces likelihood of potential adverse events Med: response to a specific documented near-miss High: response to a specific documented adverse event
Quality	Low: Nice to have Med: Decrease practice variation, promote evidence-based practices, improves communication, improves care coordination, promotes appropriate utilization of resources
Community Impact	Low: Single facility, community or region Med: Multiple communities or regions High: health system wide
Usability and Adoption	Low: reduces number of steps, time required, or training necessary or improves the user experience Med: Automates a manual process or improves inter-connectedness High: mitigates significant adoption/retention risk
Compliance	Low: improves compliance with system-approved interpretation of standards, policies and regulations Med: response to a specific upcoming site visit or audit (<3 months)
Revenue	Low: minimal impact to revenue or expense Med: Favorably impacts revenue or expenses (>100K) High: Substantially impacts revenue or expenses

Competency: Hand Grip Dynamometry for Application to Malnourished Populations

Name:
Role: ☐ **Dietitian Employee ID#:** _____ OR ☐ **Dietetic Technician Employee ID#:** _____ **CDR number** _____
Facility: _____ Department: _____

Competency Statement: Staff demonstrates knowledge, understanding of appropriate techniques, methodology, interpretation and documentation of handgrip strength training (HGS) for application as a functional assessment tool for severe disease-related malnutrition.

Performance Criteria	Evaluation Method	Learning Sources	Date Met	Comments
Completes HGS Readings	Verification on test and with supervisor/trainer	Course reading list		
Formal Presentation	Present for full presentation	Recorded webinar orf in-person presentation		
Administers examination	Minimum of 3 tested individual demonstrations	Observation by supervisor, trainer or designee		
Accurately calculates, and interprets measured results	Minimum of 3 tested demonstrations	Supervisor/designee Reviews completed worksheet		
Documents appropriate interpretation of results	Documentation Observation and feedback	Completes chart note documentation form reporting results and analysis Reviewed by supervisor/trainer		
Demonstrates and applies knowledge of precautions and contraindications for patient safety	Pass test Observation by trainer Discussion with trainer Student Feedback	Course program and materials, reading		
Test	Test Pass minimum 95%	Program materials and attendance at presentation and practice		

☐ **All of the Performance Criteria have been MET.**

Attach to CPE verification and verification of Test pass; retain for competency verification.

Evaluator Name: _____Evaluator Signature_____
Date Confirmed: _____ Student Signature _____

12/2016 tms

Grip Strength Education Sign-in
Date:
Location:

Sign-In Sheet

Sign your name, Home worksite and CDR number please

Name) Print	CDR number	Signature	Home Facility

Notes: