



**American Board for Certification
in Orthotics, Prosthetics & Pedorthics, Inc.**

Practice Analysis of Certified Practitioners

in the Disciplines of
Orthotics and Prosthetics



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Acknowledgements



On behalf of the American Board for Certification in Orthotics, Prosthetics & Pedorthics, Inc. (ABC) I am pleased to present this *Practice Analysis of Certified Practitioners in the Disciplines of Orthotics and Prosthetics*. This report describes the contemporary practice of ABC certified orthotists and prosthetists in the United States and represents the culmination of nearly 11 months of planning, execution, data analyses and writing.

A project of this magnitude depends on the hard work and commitment of many professionals, and we are pleased to acknowledge their contributions to the final product. We are indebted to the 13-member ABC Practice Analysis Task Force (PATF) – Michael J. Allen, CPO, FAAOP; Jennifer A. Bick, CO; Keven P. Dunn, CPO; Christopher J. Fairman, CPO; Stephen B. Fletcher, CPO; Michelle J. Hall, CPO, FAAOP; Carol J. Hentges, CO; Robert S. Lin, CPO, FAAOP; Timothy E. Miller, CPO; Amy L. Paulios, CP; Timothy C. Ruth, CPO and Donald D. Virostek, CPO – for the wisdom and direction they provided throughout the conduct of the study. The taskforce chairman, Steven R. Whiteside, CO, FAAOP, worked tirelessly to provide conceptual guidance and insight into the profession.

This project represents a substantial investment of ABC’s financial resources and personnel as related to ABC’s efforts in continuing to develop exemplary examination programs as well as providing information to primary and continuing education programs. I am grateful to Catherine A. Carter, ABC’s Executive Director for her thoughtful and consistent support during the conduct of the study.

James H. Wynne, CPO, FAAOP

President

Introduction

The American Board for Certification in Orthotics, Prosthetics & Pedorthics, Inc. (ABC), contracted with Professional Examination Service (ProExam) to develop and implement a practice analysis and validation study for ABC Certified Practitioners in the Disciplines of Orthotics and Prosthetics. To accomplish the objectives of the study, ProExam worked with ABC's Executive Director and a Practice Analysis Task Force (PATF) over the course of this 11-month project in 2014.

Practice analysis is a psychometrically and legally defensible strategy used to develop or update credentialing examination content and to update the description of the profession. The results are also used to identify content for in-service and/or continuing education, and to provide guidance for education and residency programs in regard to curriculum review and/or programmatic self-assessment.

ABC performed practice analysis and validation studies for Certified Practitioners in 1990, 1999 and 2006. In 2014, as planned, the delineation was revised and the profession was resurveyed in order to identify changes in the profession related to the delivery of care, technology in use today and the use of measurable treatment outcomes.

A brief summary of the themes that repeatedly emerged during the study regarding changes in the practice of the profession, recently acquired knowledge and skills, potential areas of new training and future trends in practice follows:

- Marked increase in use of technology, whether in specific devices being provided or in the use of CAD/CAM
- Widespread use of electronic medical records (EMR)
- Increased focus on the use of evidence-based research to guide clinical decision making
- Increased use of outcomes assessment tools/functional assessment tools, and the comprehensive and accurate documentation of functional results, in order to establish medical necessity
- Increased focus on justification of services for coverage and reimbursement
- Increased responsibilities, including creating detailed prescriptions, establishing functional level (K-level), specific goal setting with patients and application of research findings within the treatment plan

- Increased knowledge requirements related to availability of new devices, vacuum and micro-processor controlled components, stance-control orthoses, technology-based gait assessments, Medicare guidelines, gait analysis and pathomechanics
- Continuing shift to central fabrication meaning that while fewer practitioners are required to use their fabrication skills, they all still need to understand fabrication processes (for example, what repairs/modifications are needed, which component is not functioning)
- Increased emphasis on practice-management issues, such as difficulties with and reduced reimbursement, cost management, managing documentation, coordinating with physicians and increased paperwork

The survey respondents have provided a great service to the profession. It is imperative that as professionals and providers of patient care, practitioners recognize the importance of studies such as this that provide vital information to the standard setting mission of ABC.

Executive Summary

The specific objectives of the study were to:

- Conduct an update of the Practice Analysis of the Orthotic and Prosthetic Disciplines by delineating and validating the domains of practice, the specific tasks performed, and the associated knowledge and skills required to perform each task
- Identify differences in the disciplines of orthotics and prosthetics with regard to practice areas
- Quantify time spent and tasks performed with regard to various orthotic and prosthetic devices
- Describe—in terms of age and etiology—the patients to whom orthotic and prosthetic credentialed clinicians provide direct patient care
- Develop defensible test specifications for the disciplines of orthotics and prosthetics in connection with the multiple-choice, simulation and/or clinical patient management practical examinations for practitioner candidates

ProExam completed the following steps in collaboration with the Practice Analysis Task Force:

- Conducted one face-to-face and five virtual meetings with the task force
- Revised the delineation
- Developed an online survey of practice, the *Practice Analysis Survey of the Disciplines of Orthotics and Prosthetics*. Because of the length of the delineation, two versions of the survey were implemented, wherein respondents answered some sections in common, but were randomly routed to sub-sections of ratings for other areas. The survey included the following components:
 - Introduction: Description of the purpose of the survey and instructions for completing the survey

- Section One—Respondents were randomly routed to rate either tasks or knowledge and skills
 - ◆ Tasks, including 66 tasks delineated in association with six domains of practice
- OR
- ◆ Knowledge and Skills, including 81 knowledge and skills statements
- Section Two—Domains, including six domains of practice
- Section Three—Orthotics and Prosthetics Practice Area and Device Lists, including activities performed in connection with orthotic and prosthetic devices
- Section Four—Patient and Practice Characteristics, including questions regarding patient demographics, health care practice, services provided by ancillary staff and supervisory roles
- Section Five—Background Information, including questions about the respondent's educational and professional background, work setting and demographic characteristics
- Section Six—Comments, including open-ended questions regarding the comprehensiveness of the draft delineation and expected changes in practice

ProExam analyzed the data, developed a description of practice and developed empirically-derived test specification.

Survey Return Rate

The overall return rate was 28%. The return rate was derived by taking the number of completed surveys and dividing it by the number of surveys that were eligible to be completed. The number eligible was defined as the total number of survey invitations, minus those that were not deliverable due to invalid email addresses, or those wherein the invitee was routed out based on responding to the screening question regarding whether he or she was in practice during the past 12 months. Five thousand sixty-eight valid invitations were sent, representing the entire population of ABC-certified practitioners, and 1,401 individuals completed the survey, for an overall response rate of 28%—very acceptable when compared with studies of other professions wherein potential respondents were required to respond to a detailed and comprehensive survey such as that used in the present study.

SECTION ONE

Results Related to Professional Background, Work Setting and Demographic Information

This section provides background information regarding the sample of ABC Certified Practitioners. The survey included a questionnaire regarding professional history, work environment, educational background and demographic information.

As shown in Table 1, Table 2 and Table 3, the overall sample responding to the survey was predominantly male, over the age of 35 and Caucasian/White (non-Hispanic). This demographic picture of the sample is quite consistent with the Certified Practitioners in the ABC database.

Comparatively, the 2006 survey indicated a female population of 22% in orthotics and 13% in prosthetics. The ethnic background of the sample in 2006 showed a slightly higher percentage of Caucasian/White (non-Hispanic) with 90% in orthotics and 93% in prosthetics.

Table 1
Gender of Respondents

	Orthotics %	Prosthetics %
Female	28%	18%
Male	68%	79%
Did not answer	4%	3%
Total	100%	100%

Table 2
Age of Respondents

	Orthotics %	Prosthetics %
Under 25	0%	0%
25-34	20%	20%
35-44	23%	23%
45-54	24%	26%
55-64	25%	24%
65 or over	5%	4%
Did not answer	3%	3%
Total	100%	100%

Table 3
Racial/Ethnic Background of Respondents

	Orthotics %	Prosthetics %
American Indian or Alaska Native	0.8%	1.2%
Asian	4.1%	3.3%
Black or African American	0.8%	1.2%
Hispanic or Latino/Latina	3.3%	3.1%
White or Caucasian	82.4%	84.1%
Multiracial	1.2%	0.7%
Other	0.4%	1.0%
Did not answer	7.0%	5.3%
Total	100.0%	100.0%

About 65% of the Certified Orthotists and 75% of the Certified Prosthetists earned a baccalaureate degree in O/P, or a baccalaureate degree and an O/P certificate to initially qualify for ABC practitioner certification. About 8% of the Certified Orthotists and 6% of the Certified Prosthetists earned a master’s to initially qualify for ABC practitioner certification (see Table 4).

Comparatively, the 2006 study indicated that 3% of the Certified Orthotists and 5% of the Certified Prosthetists earned at least a master’s to initially qualify for ABC practitioner certification.

Table 4
**Initial Qualifying Education/Degree/Certificate/Diploma
 for ABC Certification**

	Orthotics %	Prosthetics %
HS/GED	1%	2%
HS/GED and O/P short-term courses	4%	2%
HS/GED and O/P certificate	7%	3%
AA/AS	5%	4%
AA/AS in O/P	4%	4%
BS in O/P	16%	21%
BA/BS and O/P certificate	49%	54%
Master’s Degree in O/P	6%	4%
Master’s Degree (non O/P)	2%	2%
Other	6%	4%
Total	100%	100%

In regard to highest education degree/certificate/diploma earned, about 14% of the Certified Orthotists earned a master’s degree or higher, while 15% of those spending a majority of their time in prosthetics earned a master’s degree or higher (see Table 5).

Table 5
Highest Level of Education Attained in Any Discipline

	Orthotics%	Prosthetics %
HS/GED	2%	1%
HS/GED and O/P short-term courses	4%	2%
HS/GED and O/P certificate	6%	3%
AA/AS	6%	4%
AA/AS in O/P	3%	4%
BA/BS (non O/P)	11%	9%
BS in O/P	15%	18%
BA/BS and O/P certificate	37%	41%
Master’s Degree in O/P	5%	4%
Master’s Degree (non O/P)	8%	11%
Doctorate	1%	1%
Other	2%	2%
Total	100%	100%

As seen in Table 6, about 74% of the orthotic credentialed sample and 69% of the prosthetic credentialed sample had 11 or more years of experience. Respondents in orthotics had an average of 20 years of experience whereas respondents in prosthetics had an average of 17 years of experience.

Table 6
Years of Experience in Orthotic or Prosthetic Practice

	Orthotics %	Prosthetics %
5 or less	16%	16%
6-10	9%	15%
11-20	22%	24%
21-30	27%	26%
31 or more	26%	19%
Total	100%	100%

As seen in Table 7, Certified Orthotists devoted 63% of their work time to clinical orthotic patient care (about 33% in custom fabricated, made to patient model, 15% each in custom fabricated, made to measure and in pre-fabricated); about 10% in clinical prosthetic patient care and prosthetic fabrication; about 12% in administration, 6% in education and about 2% in research.

Compared to the 2006 study, this data shows a modest change in how Certified Orthotists spend their time. The custom fabricated, made to patient model and made to measure categories combined showed they spend 48% of their time in this area. The 2006 study asked this as one question and the result was 40%. The time spent providing prefabricated items remained the same at 15%.

Certified Prosthetists devoted about 40% of their work time to clinical prosthetic patient care and 11% to prosthetic fabrication; about 24% of time to orthotics-related activities; 15% to administration; 7% related to education and about 2% in research.

Compared to the 2006 study, this data shows that Certified Prosthetists spend slightly less time in clinical prosthetic patient care and in prosthetic fabrication overall and more time in clinical orthotic patient care. A small amount of time is being spent in what is now reported as time spent in Research, a category not used in 2006. It should be noted that dually certified respondents were asked to choose only one discipline for the survey questions. This explains why dually certified practitioners reported spending time in the other discipline.

Table 7
Primary Work Performed

	Orthotics %	Prosthetics %
Clinical prosthetic patient care	7%	40%
Clinical orthotic patient care (custom fabricated, made to patient model)	33%	10%
Clinical orthotic patient care (custom fabricated, made to measure)	14%	5%
Clinical orthotic patient care (pre-fabricated)	15%	6%
Prosthetic fabrication	2%	11%
Orthotic fabrication	8%	3%
Education	6%	7%
Research	2%	2%
Administration	12%	15%
Other	<1%	1%
Total	100%	100%

In describing their primary work setting, 56% of the Certified Orthotists work in either a privately owned (36%) or publicly owned (20%) multi-facility orthotic and prosthetic organization, 21% work in a single-location facility (privately owned) and 15% work in a hospital-based practice.

In regard to the Certified Prosthetists, 57% work in either a privately owned (36%) or publicly owned (21%) multi-facility orthotic and prosthetic service organization, 22% work in a single-location facility (privately owned) and 13% work in a hospital-based practice (see Table 8).

The 2006 survey indicated that 54% of the Certified Orthotists and 53% of the Certified Prosthetists in prosthetics reported working in either a privately owned or publicly owned multi-facility orthotic and prosthetic service organization. The percentage of Certified Orthotists who reported working in a single-location facility (privately owned) has remained unchanged at 21%, while the Certified Prosthetists who reported working in a single-location facility (privately owned) has decreased from a previous 25%. Hospital based employment fell from a previous reporting of 17% for orthotics and 13% for prosthetics.

Table 8
Primary Work Setting

	Orthotics %	Prosthetics %
Part of a multi-facility orthotics and/or prosthetics practice, publicly owned	20%	23%
Part of a multi-facility orthotics and/or prosthetics practice, privately owned	36%	35%
Single-location orthotics and/or prosthetics practice, privately owned	21%	22%
Hospital or rehabilitation center	15%	11%
University-based clinic or facility	2%	2%
Academic or educational institution (teaching/research)	1%	3%
Central fabrication facility	<1%	<1%
Other	5%	4%
Total	100%	100%

Certified Practitioners deliver direct patient care in a variety of settings. As seen in Table 9, the greatest number of Certified Orthotists and Prosthetists provide patient care in a private office (54% and 63%, respectively). Certified Orthotists are less likely to provide care in an acute care hospital (14%) and a specialty clinic (11%) and least likely to provide care in either a long-term care facility or any other type of facility. The pattern is slightly different for Certified Prosthetists. Fewer than 8% provide direct patient care in any other specifically-delineated setting.

The 2006 survey showed very little change in the percentage of Certified Practitioners in both orthotics and prosthetics in specialty clinics (11% and 5% respectively) and slightly less in acute care hospital settings (16% and 10% respectively).

Table 9
Direct Patient Care that Occurred in Various Settings

	Orthotics %	Prosthetics %
Private office	54%	63%
Specialty clinic (for example, neuromuscular, cerebral palsy, spina bifida)	11%	4%
Acute care hospital	14%	8%
Long-term-care facility (for example, nursing home, assisted living facility)	5%	8%
Stand alone rehabilitation facility	6%	7%
Patient's residence	4%	7%
Any other facility	5%	3%

In regard to the number of orthotics/prosthetics employees at the respondents' primary work setting, the average number of credentialed practitioners was five for orthotics and four for prosthetics. The number of non-credentialed employees was lower. Respondents also work with a number of other credentialed and non-credentialed staff, including administrative staff, technicians, and to a lesser extent, other professionals. (See Table 10)

Table 10
**Number of Credentialed and Non-Credentialed Personnel
 in Each Position at Primary Work Setting**

	Credentialed personnel			Non-credentialed personnel		
	Orthotics	Prosthetics	Total	Orthotics	Prosthetics	Total
Practitioners	4.9	3.9	4.5	1.4	1.0	1.2
Residents	.9	.8	.9	.4	.3	.4
Assistants	.6	.6	.6	.3	.3	.3
Pedorthists	.8	.5	.7	.2	.2	.2
Fitters	1.0	1.0	1.0	.5	.5	.5
Technicians	2.7	1.7	2.3	2.1	1.5	1.8
Administrative staff	3.8	3.1	3.5	3.5	3.1	3.3

As seen in Table 11, regardless of discipline, respondents were most likely to supervise about two other patient-care providers

Table 11
Number of Patient Care Providers Directly Supervised

Orthotics	Prosthetics
1.9	2.3

Table 12 documents the age distribution of patients by discipline. In orthotics, patients are equally likely to be pediatric (37%) or adult age (36%) and only somewhat less likely to be geriatric age (27%). In prosthetics, patients are most likely to be adult age (52%), less likely to be geriatric age (37%) and least likely to be pediatric ages (11%).

The 2006 survey showed that in orthotics, patients were slightly more likely to be adult age (37%) than to be pediatric (33%) and only somewhat less likely to be geriatric age (30%). In prosthetics, patients were slightly more likely to be geriatric age (46%) than adult age (43%) and least likely to be pediatric ages (11%).

Table 12
Percentage of Patients in Each Age Range

	Orthotics	Prosthetics
Pediatric (0 to 18)	37%	11%
Adult (19 to 65 years)	36%	52%
Geriatric (more than 65 years)	27%	37%

The percentage of patients in each etiological category is shown in Table 13. Nearly two thirds of prosthetic patients present with disease, while less than half of orthotics patients do so. About one quarter of patients in each discipline present with trauma. A large difference is also found regarding congenital etiologies; 30% of orthotic patients, but only 9% of prosthetic patients are in this category.

Comparatively, the 2006 survey indicated similar numbers with the orthotic credentialed sample (50% disease-based, 26% trauma-based, 24% congenital-based) and with the prosthetic sample (67% disease-based, 24% trauma-based, 9% congenital-based).

Table 13
Percentage of Patients in Each Etiological Category

	Orthotics	Prosthetics
Disease	44%	66%
Trauma	26%	25%
Congenital	30%	9%

The phases of care in which patients fall also differ by discipline. As documented in Table 14, orthotics patients are most likely to be in the rehabilitative or chronic phase of care, and less likely to be in the acute phase. Prosthetic patients are also more likely to be in the rehabilitative phase of care, but at a higher rate (nearly half), less likely to be in the chronic phase and least likely to be in the acute phase of care.

Table 14
Percentage of Patients in Each Phase of Care

	Orthotics	Prosthetics
Acute phase of care	24%	20%
Rehabilitative phase of care	39%	47%
Chronic phase of care	37%	33%

In regard to technology, respondents were asked to indicate the percentage of their orthoses/prostheses which incorporated CAD/CAM (see Table 15). Prostheses were somewhat more likely to incorporate CAD/CAM than orthoses, 23% and 18%, respectively.

The 2006 survey similarly showed that prostheses were somewhat more likely to incorporate CAD/CAM than orthoses, 24% and 16%, respectively.

Table 15
Percentage of Orthoses/Prostheses Incorporating CAD/CAM

Orthotics	Prosthetics
18%	23%

In regard to fabrication, respondents were asked the percentage of orthoses/prostheses fabricated onsite or in a central fabrication facility. As seen in Table 16, both orthoses and prostheses were more likely to be fabricated onsite than at a central fabrication facility. On the other hand, the likelihood of onsite fabrication versus central laboratory fabrication was greater in the case of prosthetic devices.

Table 16
Percentage of Orthoses/Prostheses Fabricated Onsite or at Central Fabrication Facility

	Orthoses	Prostheses
Onsite	57%	69%
Central fabrication	43%	31%

Table 17 and Table 18 document the categories of personnel performing various types of activities for the orthotics and prosthetics disciplines, respectively. As can be seen in Table 17, Certified Orthotic Practitioners performed all seven types of activities. Over 90% of the respondents indicated that they *perform initial assessment, measure/mold/scan, fit patient, follow-up assessment/education* and *modify/repair*. On the other hand, Certified Orthotic Practitioners were less likely to *modify model/image* (77%) or *fabricate* (55%).

Table 17

Personnel at Work Setting Who Perform Each Type of Activity, Orthotics

	Perform initial assessment	Measure/mold/scan	Modify model/image	Fabricate	Fit patient	Follow-up assessment/education	Modify/repair
Practitioners, including residents	95%	94%	77%	55%	93%	94%	92%
Pedorthists	29%	29%	20%	15%	28%	28%	27%
Assistants	10%	15%	10%	12%	17%	14%	17%
Fitters	26%	24%	6%	5%	31%	26%	21%
Technicians	2%	3%	31%	55%	4%	3%	35%
Non-clinical staff	1%	1%	1%	2%	1%	4%	2%

In the case of prosthetics, over 92% of the Certified Practitioners performed six of the seven activities (see Table 18). As was the case with orthotics, Certified Prosthetists were less likely to perform activities related to *fabricate* (60%).

Table 18

Personnel at Work Setting Who Perform Each Type of Activity, Prosthetics

	Perform initial assessment	Measure/mold/scan	Modify model/image	Fabricate	Fit patient	Follow-up assessment/education	Modify/repair
Practitioners, including residents	96%	96%	92%	60%	96%	95%	93%
Pedorthists	23%	23%	18%	13%	23%	22%	22%
Assistants	9%	12%	10%	12%	12%	13%	18%
Fitters	24%	19%	8%	7%	29%	26%	21%
Technicians	2%	3%	20%	60%	3%	3%	40%
Non-clinical staff	1%	1%	0%	2%	1%	3%	1%

SECTION TWO

Results Related to Domains, Tasks, Knowledge and Skill Statements

Domains are global areas of responsibility performed by credentialed professionals; in the current delineation, the domains were identified as Patient Assessment, Formulation of the Treatment Plan, Implementation of the Treatment Plan, Follow Up to the Treatment Plan, Practice Management and Promotion of the Competency and Enhancement of Professional Practice.

Tasks are the activities performed within a domain of practice.

Knowledge and skill statements describe the organized body of information and the physical or mental manipulation of information or things required to perform the tasks associated with each domain.

A layout of the final structure of the delineation specifying domains and the number of task statements associated with each domain is contained in Table 19.

Table 19

Domains and Tasks

Domain	Number of Tasks
Patient Assessment	8
Formulation of the Treatment Plan	9
Implementation of the Treatment Plan	19
Follow Up to the Treatment Plan	18
Practice Management	6
Promotion of the Competency and Enhancement of Professional Practice	6
Total	66

The task force developed nine new task statements from the list used in the 2006 study. A total of 81 knowledge and skill statements were developed for the current practice analysis, an increase from the 74 used in the previous study.

Domains

Results and Discussion Related to the Domains

This section presents the results of the ratings related to the six domains delineated in the survey.

Respondents to the survey rated each of the domains on two ratings scales:

- **Percentage of Time**—Overall, what percentage of your work time did you spend performing the tasks related to each domain during the last 12 months in which you worked?
- **Criticality**—How critical is this domain to optimizing outcomes for patients?

Table 20 presents the results of the Percentage of Time and Criticality rating scales for Certified Practitioners in both disciplines. As can be seen, Certified Practitioners in both disciplines indicated that they spend the most time performing tasks associated with either Patient Assessment or Implementation of the Treatment Plan. Regardless of discipline, respondents spend between 22% and 24% of their time in each of these two domains. Respondents spend the least time performing tasks associated with Promotion of Competency and Enhancement of Professional Practice (about 8% regardless of discipline). They spend between 14% and 17% of their time performing tasks associated with each of the remaining three specifically delineated domains—Formulation of the Treatment Plan, Follow-up to the Treatment Plan and Practice Management.

The mean Criticality ratings for the four domains related to direct patient care indicate that these domains are all rated at the upper end of the scale, between moderately critical and highly critical (i.e., 3.6 to 3.9). The mean Criticality ratings for the two non-direct patient care domains indicate that these two domains are also moderately to highly critical (3.1 to 3.4). Accordingly, all six domains appropriately focus on activities that are critical to optimizing outcomes for patients, caregivers and healthcare providers.

Table 20
Descriptive Statistics for Domains
Frequency and Criticality

	Percentage of Time ¹		Criticality ²	
	O	P	O	P
Domain 1—Patient Assessment: Perform a comprehensive assessment of the patient, including their functional baseline, to understand the patient's orthotic/prosthetic needs, goals and expectations	24.4%	19.7%	3.9	3.9
Domain 2—Formulation of the Treatment Plan: Analyze and integrate information from patient assessment to create a comprehensive orthotic/prosthetic treatment/care plan to meet the needs, goals and expectations of the patient	16.5%	14.1%	3.8	3.8
Domain 3—Implementation of the Treatment Plan: Perform/direct all procedures necessary, including fabrication, to provide the comprehensive orthotic/prosthetic treatment/care	22.3%	24.8%	3.8	3.8
Domain 4—Follow-up to the Treatment Plan: Provide continuing patient care through periodic evaluation to assure, maintain and document optimal fit and function of the orthosis/prosthesis	14.0%	17.0%	3.6	3.7
Domain 5—Practice Management: Adhere to policies and procedures regarding human resources, physical environment, business and financial practices, reimbursement requirements and organizational management	14.3%	15.6%	3.3	3.4
Domain 6—Promotion of Competency and Enhancement of Professional Practice: Participate in personal and professional development through continuing education, professional training, research and volunteering for professional organizations	7.6%	7.4%	3.1	3.1
Other	0.9%	1.5%		

¹ Overall, what percentage of your work did you spend performing the tasks related to each domain during the past year?

² How critical is this domain to optimizing outcomes for patients, caregivers and health care providers?

1= Not critical, 2= Minimally critical, 3= Moderately critical, 4= Highly critical.

Tasks

Results and Discussion Related to the Tasks

The results in this section document the quantitative ratings of the respondents on the task statements delineated in association with each of the six domains as well as the qualitative comments regarding the comprehensiveness of the delineation. All survey respondents rated the tasks on two rating scales:

- **Frequency**—How frequently did you perform each task or activity during the past 12 months?
- **Criticality**—How critical is this task or activity to optimizing outcomes for patients?

Table 21 displays the mean *Frequency* and *Criticality* ratings for Certified Practitioners in both disciplines. As can be seen, with only six exceptions, the *Frequency* ratings for Certified Practitioners in both orthotics and prosthetics are similar; they do not vary by more than 0.2 of a rating scale point. Four of the six tasks were associated with two domains—*Implementation of the Treatment Plan* and *Follow-up to the Treatment Plan*. Regardless of discipline, the ratings indicate that Certified Practitioners perform the overwhelming majority of tasks *frequently-to-routinely*. Except for three tasks in one domain, *Promotion of Competency* and *Enhancement of Professional Practice*, they perform the remaining tasks *occasionally-to-frequently*. A review of those three tasks associated with lower frequency ratings indicates that these tasks do not readily lend themselves to frequent performance (for example, *Conduct or participate in product development research, clinical trials and outcome studies*).

In only six instances did the *Frequency* ratings of the Certified Practitioners in the disciplines of orthotics and prosthetics vary by more than 0.2 of a rating scale point. Certified Practitioners in prosthetics were more likely than Certified Practitioners in orthotics to:

- Provide patient with preparatory care for orthotic/prosthetic treatment (for example, diagnostic device, compression garment/shrinker)
- Create a positive model (for example, fill, cast, carve positive model, reverse tracing)
- Modify the patient model/digital image for fabrication
- Fabricate and/or assemble orthosis/prosthesis for initial or diagnostic fitting and/or delivery

- Refer patient to appropriate healthcare providers for necessary ancillary care
- Assess patient's psychosocial status (e.g., family status, job or caregiver), and note any changes
- Modify the patient model/digital image for fabrication

With only two exceptions, the *Criticality* ratings for Certified Practitioners in both disciplines are very similar; that is, within 0.2 of a rating scale point. Certified Practitioners rated all tasks as *moderately-to-highly critical*. Certified Prosthetists rated the following two tasks more than 0.2 higher on the *Criticality* rating scale:

- Provide patient with preparatory care for orthotic/prosthetic treatment (for example, diagnostic device, compression garment/shrinker)
- Modify the patient model/digital image for fabrication

In summary, the overall pattern of the *Frequency* and *Criticality* ratings on the tasks indicates that the practice analysis delineation included critical tasks performed by Certified Practitioners in both disciplines. The pattern of *Frequency* and *Criticality* ratings for the Certified Practitioners in both disciplines validates the use of these tasks in initiatives related to examination development.

Table 21
Descriptive Statistics for Tasks
Frequency and Criticality

	Frequency		Criticality	
	O	P	O	P
Domain 1—Patient Assessment				
Review patient’s prescription/referral	4.9	4.8	3.9	3.7
Take a comprehensive patient history, including demographic characteristics, family dynamics, previous use of an orthosis/prosthesis, diagnosis, work history, avocational activities, signs and symptoms, medical history (including co-morbidities, surgeries, allergies, current medications, fall history and risk), reimbursement status, patient compliance with ancillary care, results of diagnostic evaluations	4.6	4.6	3.7	3.8
Ascertain patient goals and expectations	4.7	4.7	3.8	3.8
Perform a diagnosis-specific clinical, functional and cognitive examination (for example, manual muscle testing, gait analysis, functional level (K level classification), evaluation of anatomy, range of motion, joint stability, skin integrity, sensory function)	4.5	4.5	3.7	3.7
Determine a baseline by administering outcome measurement tools (for example, pain scale, timed walk test, amputee mobility predictor)	3.3	3.4	2.9	3.0
Consult with other healthcare providers and caregivers, as appropriate, about patient’s condition in order to formulate a treatment plan as a part of the comprehensive plan of care	4.0	3.9	3.4	3.3
Document the findings of the patient assessment using established record-keeping requirements	4.7	4.6	3.8	3.6
Refer patient, if appropriate, to other healthcare providers for intervention beyond orthotic/prosthetic scope of practice	3.6	3.8	3.3	3.5
Domain 2—Formulation of the Treatment Plan				
Evaluate the findings of the patient assessment	4.7	4.5	3.7	3.6
Formulate treatment goals based on expected orthotic/prosthetic outcomes (for example, reduce pain, provide stability, prevent deformity and/or promote healing to enhance function and independence)	4.7	4.6	3.8	3.7
Communicate with the referral source to modify, if necessary, the original prescription and/or treatment plan	3.8	3.7	3.6	3.6

Frequency: 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, 5=Routinely

Criticality: 1= Not, 2=Minimally, 3=Moderately, 4=Highly

	Frequency		Criticality	
	O	P	O	P
Investigate treatment options by obtaining evidence from the literature (for example, research, manufacturer's information) to formulate the treatment plan	3.3	3.4	3.0	3.0
Develop a treatment plan which includes patient education and follow-up that is based on patient evaluation, medical necessity, aesthetic considerations, patient's goals and expectations and treatment goals	4.5	4.6	3.6	3.7
Identify design, materials and components needed to implement the treatment plan	4.7	4.7	3.8	3.7
Communicate with the patient and/or caregiver about the recommended treatment plan and any optional plans, including disclosure of potential risks, benefits and limitations in orthotic or prosthetic care	4.7	4.7	3.8	3.8
Document treatment plan specifying medical necessity using established record-keeping requirements	4.7	4.6	3.7	3.7
Ensure that patient or responsible parties are informed of their financial responsibilities (for example, insurance eligibility, verification of benefits, prior authorization, deductibles) as they pertain to proposed treatment plan	4.3	4.1	3.6	3.7
Domain 3—Implementation of the Treatment Plan				
Inform patient, family and/or caregiver(s) of the measurement/shape capture technique, including the possible risks and time involved	4.5	4.3	3.3	3.1
Provide patient with preparatory care for orthotic/prosthetic treatment (for example, diagnostic device, compression garment/shrinker)	3.6	4.5	3.1	3.7
Select appropriate technique (for example, measure, take impression, trace limb, digital scan) in order to obtain a patient model/image	4.9	4.8	3.8	3.8
Prepare patient for measurement/shape capture (for example, apply stockinette, identify anatomical landmarks)	4.9	4.7	3.8	3.8
Perform measurement/shape capture (for example, measure, take impression, trace limb, digital scan)	4.9	4.8	3.9	3.9
Refer to manufacturer's specifications and other technical resources regarding components/materials	4.0	4.1	3.4	3.5

Frequency: 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, 5=Routinely

Criticality: 1= Not, 2=Minimally, 3=Moderately, 4=Highly

	Frequency		Criticality	
	O	P	O	P
Select appropriate materials and components for orthosis/prosthesis based on patient criteria to ensure optimum strength, durability and function (for example, orthotic joints, prosthetic components and lamination or thermoforming techniques)	4.8	4.7	3.8	3.8
Create positive model (for example, fill cast, carve positive model, reverse tracing)	3.8	4.3	3.4	3.5
Modify the patient model/digital image for fabrication	3.7	4.7	3.4	3.8
Fabricate and/or assemble orthosis/prosthesis for initial or diagnostic fitting and/or delivery	3.3	3.9	3.1	3.3
Prior to fitting and delivering the device to the patient, assess the item for structural safety and ensure that manufacturers' guidelines have been followed (for example, torque values, patient weight limits)	4.6	4.6	3.7	3.8
Ensure that materials, design and components are provided as specified in the treatment plan	4.8	4.7	3.8	3.8
Fit, assess and align orthosis/prosthesis in sagittal, transverse and coronal planes in order to achieve maximum function and ensure patient safety	4.8	4.8	3.9	3.9
Complete fabrication process after achieving optimal fit and function of orthosis/prosthesis (for example, convert diagnostic device/socket to definitive orthosis/prosthesis)	3.7	3.7	3.3	3.4
Assess orthosis/prosthesis for structural safety and optimal alignment prior to patient delivery	4.8	4.7	3.8	3.9
Administer outcome measure at delivery and compare to baseline	3.6	3.4	3.2	3.1
Educate patient, family and/or caregiver(s) about the use and maintenance of the orthosis/prosthesis (for example, wear schedules, care instructions)	4.9	4.8	3.9	3.9
Refer patient to appropriate healthcare providers for necessary ancillary care	3.8	4.1	3.3	3.5
Document treatment and outcomes using established record-keeping requirements to verify implementation of treatment plan	4.7	4.6	3.7	3.7

Frequency: 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, 5=Routinely

Criticality: 1= Not, 2=Minimally, 3=Moderately, 4=Highly

	Frequency		Criticality	
	O	P	O	P
Domain 4—Follow-up to the Treatment Plan				
Obtain feedback from patient and/or caregiver to evaluate outcome (for example, adherence to wear schedule, comfort, perceived benefits, perceived detriments, ability to don and doff, proper usage and function, overall patient satisfaction)	4.4	4.5	3.6	3.7
Assess the patient's function and note any changes	4.5	4.6	3.6	3.7
Assess patient's skin condition (for example, integrity, color, temperature) and volume, note any changes	4.7	4.7	3.7	3.8
Assess patient's general health, height, weight and note any changes	4.2	4.3	3.3	3.5
Assess patient's psychosocial status (for example, family status, job or caregiver) and note any changes	3.5	3.9	3.0	3.2
Assess fit of orthosis/prosthesis relative to anatomical accuracy (for example, multiple force systems, total contact)	4.7	4.7	3.8	3.8
Assess alignment of orthosis/prosthesis relative to treatment goals (for example, segmental relationships, dynamic alignment)	4.7	4.7	3.7	3.9
Assess function of orthosis/prosthesis relative to treatment goals	4.7	4.6	3.8	3.7
Assess the patient's progress toward treatment goals	4.4	4.4	3.6	3.6
Formulate plan to modify orthosis/prosthesis based on assessment of outcomes and inform patient and/or caregiver of plan to modify orthosis/prosthesis as necessary	4.4	4.4	3.6	3.6
Make, supervise and/or delegate modifications to orthosis/prosthesis (for example, relieve pressure, change range of motion, change alignment, change components)	4.5	4.6	3.7	3.7
Assess modified device for structural safety	4.7	4.5	3.8	3.8
Evaluate the functional results of modifications to orthosis/prosthesis, including static and dynamic assessments	4.7	4.7	3.8	3.8
Administer outcome measure and compare to baseline	3.5	3.5	3.1	3.2
Assess patient's ability to use orthosis/prosthesis following modifications	4.7	4.7	3.8	3.8

Frequency: 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, 5=Routinely

Criticality: 1= Not, 2=Minimally, 3=Moderately, 4=Highly

	Frequency		Criticality	
	O	P	O	P
Develop and revise long-term follow-up plan and communicate with patient/family/caregiver(s)	4.2	4.2	3.4	3.4
Document findings, actions and follow-up plan using established record keeping requirements	4.7	4.6	3.6	3.7
Communicate changes in patient's condition to referral sources	3.6	3.7	3.2	3.2
Domain 5—Practice Management				
Adhere to policies and procedures in compliance with all applicable federal and state laws and regulations and professional and ethical guidelines (for example, CMS, HIPAA, OSHA, ABC Accreditation Standards and ABC Code of Professional Responsibility)	4.9	4.9	3.8	3.8
Develop and implement personnel policies and procedures (for example, employee orientation, benefits, training, incentives, staff recognition, regular performance evaluations)	3.5	3.5	3.3	3.3
Adhere to policies and procedures for patient care that comply with current medical, legal and third-party reimbursement requirements	4.8	4.8	3.8	3.8
Document patient medical and financial records using established record-keeping requirements	4.6	4.6	3.7	3.7
Create a professional, cooperative working environment to improve patient care	4.8	4.7	3.8	3.8
Use data to analyze current practices and identify opportunities for improvement	3.5	3.5	3.3	3.3

Frequency: 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, 5=Routinely

Criticality: 1= Not, 2=Minimally, 3=Moderately, 4=Highly

	Frequency		Criticality	
	O	P	O	P
Domain 6 -- Promotion of Competency and Enhancement of Professional Practice				
Participate in or provide continuing education for orthotists, prosthetists and other health-care providers through activities such as seminars, case studies and authoring publications	3.6	3.6	3.3	3.3
Participate in education and mentoring of residents, students and trainees	3.5	3.4	3.2	3.2
Conduct or participate in product development, research, clinical trials and outcome studies	2.4	2.4	2.9	2.9
Participate in the development, implementation and monitoring of public policy regarding orthotics/prosthetics (for example, provide testimony/information to legislative/regulatory bodies, serve on professional committees and regulatory agencies)	1.9	2.0	2.9	2.9
Contribute to the profession (for example, volunteer in professional organizations, committees and licensure boards)	2.3	2.4	2.8	2.9
Promote the awareness, competency and enhancement of the orthotic/prosthetic profession	3.3	3.4	3.2	3.2

Frequency: 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, 5=Routinely

Criticality: 1= Not, 2=Minimally, 3=Moderately, 4=Highly

Knowledge and Skill Statements

All survey respondents rated the knowledge and skill statements on two rating scales:

- **Criticality**—How critical is this knowledge or skill to optimizing outcomes for patients?

The *Criticality* ratings for 76 of the 81 statements indicate that these knowledge and skills are *moderately-to-highly critical* in regard to optimizing outcomes for patients.

- **Point of Acquisition**—At what point should this knowledge or skill be acquired by an O&P practitioner?

The *Acquisition* rating scale is used to determine the point at which a knowledge or skill is required for practice. To the degree that respondents support *Acquisition primarily before passing the ABC examinations*, a body of knowledge or a skill may be considered as validated for inclusion in a credentialing program such as ABC's programs for Certified Practitioners.

In the case of the orthotic credentialed sample of Certified Practitioners, a simple majority of respondents supported the acquisition of 73 of the 81 knowledge and skills primarily *before* passing the ABC examinations. Using a similar criterion for the prosthetic credentialed sample of Certified Practitioners, 71 of the 81 knowledge and skills were supported for acquisition primarily *before* passing the ABC examinations.

Knowledge and Skill Statements

Knowledge of:

Musculoskeletal anatomy, including upper limb, lower limb, spinal, cranial

Neuroanatomy and neurophysiology

Systems anatomy (for example, motor control, vestibular, somatosensory)

Surface anatomy

Medical terminology

Kinesiology, including upper limb, lower limb, spinal

Normal human locomotion

Observational gait assessment

Knowledge and Skill Statements

Knowledge of:

Pathological gait

Gait training

Tissue characteristics and management

Wound Care

Volumetric control

Planes of motion

Biomechanics

Mechanics (for example, levers and force systems)

Pathologies (for example, muscular, neurologic, skeletal, vascular)

Basic pharmacology

Referral documents

Procedures for data collection and recording

Policies and procedures regarding protected health information (PHI)

Roles and responsibilities associated with other healthcare professions

Reimbursement protocols (for example, CMS, DME MAC, LCDs)

Material safety procedures and standards (for example, OSHA, SDS)

Universal precautions

Orthotic/prosthetic design

Orthotic/prosthetic fitting criteria

Clinical examination techniques (for example, range of motion, manual muscle tests, sensation, proprioception)

Measurement and shape capture techniques, materials, devices and equipment

Measurement tools and techniques

Modification/rectification procedures as they relate to specific orthotic/prosthetic designs

Knowledge and Skill Statements

Knowledge of:

Orthotic/prosthetic forms (for example, assessment, orthometry, measurement, evaluation, outcomes)

Outcome measurement

Materials science

Components

Alignment devices and techniques

Hand and power tools

Care and maintenance of orthoses/prostheses

Computer-aided design and manufacturing

Item warranty and warranty limitations

Loss control (for example, risk management, inventory control)

Research methodology and literature

Biostatistics

Human development and aging, ranging from pediatric to geriatric, as they relate to orthotic and prosthetic treatment

The psychology of patients with disability

Patient educational materials

Ethical standards, including *ABC Code of Professional Responsibility*

Scope of practice related to orthotic/prosthetic credentials

Boundaries of the scope of practice (for example, when to refer a patient to other healthcare providers/caregivers)

Federal and state rules, regulations and guidelines (for example, FDA, HIPAA)

ABC Facility Accreditation Standards

NCOPE Residency Standards

Knowledge and Skill Statements

Skill in:

Interpreting referral documents (for example, prescriptions, orders)

Interpreting radiological images

Communicating with patient/family/caregiver

Communicating with referral sources and appropriately licensed healthcare providers

Performing clinical assessment

Identifying surface anatomy

Interpreting physical findings (for example, recognizing skin pressures, dermatological conditions)

Analyzing normal and pathological gait/motion

Analyzing orthotic/prosthetic gait/motion

Managing patients relative to their diagnosis or condition

Critically assessing the literature as it pertains to patient care

Measuring and capturing shapes of patients for orthoses/prostheses

Using mechanical measuring devices

Using computer-based measuring devices/scanning devices

Delineating, rectifying and/or modifying patient models

Fabricating orthotic/prosthetic devices

Use of safety equipment

Using hand and power tools

Selecting appropriate materials and components

Using alignment devices

Aesthetic finishing

Evaluating fit and function of an orthosis/prosthesis

Selecting, administering and interpreting outcome measures

Adjusting and modifying orthoses/prostheses

Maintaining and repairing orthoses/prostheses

Restoring optimal fit and function of orthoses/prostheses

Resolving patient's problems related to activities of daily living

Refining treatment plans to reflect patient's change in health status

Documenting

SECTION THREE

Results Related to Practice Areas and Devices

All survey respondents were asked to characterize the nature of their work in regard to an extensive list of orthotic or prosthetic devices, as appropriate. Dually certified respondents were asked to complete the task for the one discipline in which they spend the most time.

The results of these rating activities should be reviewed very carefully, as they provide guidance with regard to the development and/or refinement of ABC’s certification examinations. The results also provide guidance to National Commission on Orthotic and Prosthetic Education (NCOPE) in the development of orthotic and prosthetic residency and education standards.

Orthotic Practice Areas and Devices

ABC Certified Orthotists completed 10 different percentage allocation ratings related to the array of orthoses they provide to patients.

Figure 1 documents the percentage of time Certified Orthotists spend in various orthotic practice areas. As can be seen, these practitioners spend more than one half of their time in the lower extremity practice area and all but 1% of their time in the remaining specifically-delineated practice areas.

Figure 1 – Percentage of Time in Orthotic Practice Areas

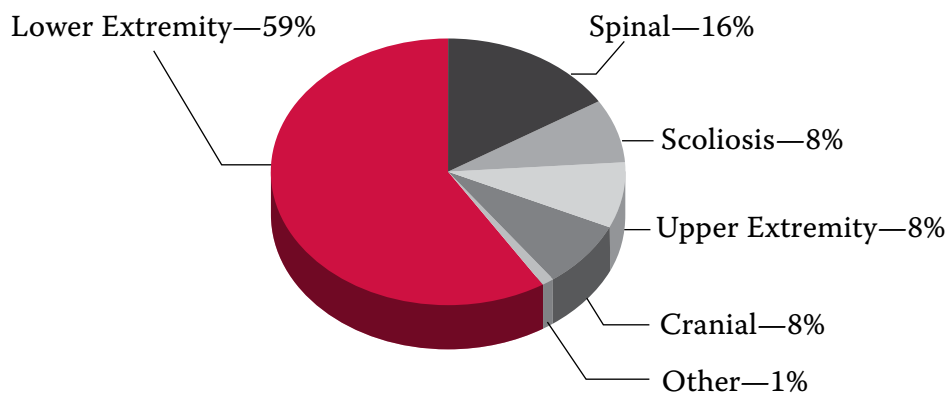


Table 22 documents the time allocations of the Certified Practitioners who spent the majority of their time providing orthotic-related services. As can be seen, these Certified Orthotists spend more than one half of their time (59%) performing tasks in connection with lower extremity orthoses. Of that time, they spend about one half (about 18%) performing tasks in connection with AFOs, and somewhat less time performing tasks in connection with FOs (8%), orthopedic/diabetic shoes (7%) and KOs (6%), and the least time performing tasks in connection with any of the other lower extremity practice areas.

Certified Orthotists spend about 24% of their time performing tasks in connection with either spinal orthoses (16%) or scoliosis-related orthoses (8%), most typically TLSOs in the case of both spinal- or scoliosis-related orthoses. Time spent in upper extremity orthoses (8%) is most likely to be spent performing tasks in connection with WHO or WHFO orthoses (2.7% and 1.8% respectively).

With regard to cranial orthoses (about 8%), respondents were most likely to spend time performing tasks in connection with cranial remolding orthoses (4.7%). As anticipated, there was an increase in the time spent providing cranial remolding orthosis. In 2006 Certified Orthotists reported spending 3% of their time providing cranial remolding orthoses. The survey broke out Cranial as a distinct practice area. This was a change from the 2006 instrument.

Finally, respondents spend little time performing tasks in connection with any other type of orthoses. There was a modest increase in the percentage of time spent in Lower Extremity compared to 2006. This was likely associated with a slight decrease in both Spinal and Scoliosis.

Table 22**Percentage of Time in Practice Areas with Regard to Orthoses**

Practice Area	Area	Orthoses
Lower Extremity	59%	
Orthopedic/Diabetic shoes		6.8%
Custom shoes		1.3%
Shoe modifications		1.9%
FO		7.7%
Partial foot insert		1.6%
Foot abduction orthosis/Denis Browne/Ponseti		1.5%
SMO		4.8%
AFO		18.2%
FES		0.6%
KO		5.9%
KAFO		3.9%
HO		1.6%
HKAFO/RGO		0.9%
Dynamic contracture orthosis		1.4%
Other		0.3%
Spinal	16%	
LSO semi-rigid		3.7%
LSO rigid		2.6%
TLO (including Jewett or CASH)		1.6%
TLSO		5.4%
CTLSO		0.4%
CTO/HCO (including Minerva)		0.5%
CO		1.4%
Halo		0.3%
Other		0.1%
Scoliosis	8%	
LSO		1.1%
TLSO		6.7%
CTLSO (Milwaukee)		0.2%

Practice Area	Area	Orthoses
Upper Extremity	8%	
HO		0.5%
WHFO		1.8%
WHO		2.7%
EWHO		0.3%
EO		0.8%
SEWHO		0.2%
SO		0.3%
Dynamic contracture orthosis		0.4%
Humeral fracture orthosis		0.9%
Elbow fracture orthosis		0.4%
Other		0.1%
Cranial	8%	
Protective soft helmet		1.4%
Protective rigid helmet		1.4%
Cranial remolding orthosis		4.7%
Other		0.1%
Other	1%	
Protective or burn facemask		0.1%
Dynamic chest compression or Pectus carinatum orthosis		0.3%
Compression garments and wraps		0.5%
Therapeutic postural-control orthoses (Theratogs, Wunzies)		0.2%
Other		0.3%

Tables 23 through 30 each present specific details about various types of orthoses (for example, design type, material, category of orthosis). As documented in Table 23, lower extremity orthoses are most likely to be thermoplastic (71%), and less likely to be either thermoset/composite (17%) or conventional (metal, leather) (12%).

Table 23

Percentage of Lower Extremity Orthoses in Each Category

Conventional (metal, leather)	12%
Thermoplastic	71%
Thermoset/Composite	17%

The overwhelming majority of KAFOs are mechanical, whereas 9% employ stance control and only 1% use microprocessors.

Table 24

Percentage of KAFOs in Each Category

Mechanical (for example, posterior offset, drop locks)	90%
Stance control	9%
Microprocessor	1%

As documented in Table 25, Certified Orthotists indicated that 73% of their patients' AFOs were custom fabricated to patient model, while only 18% were custom fit (pre-fabricated devices) and only 9% were custom fabricated to patient measurement.

Table 25

Percentage of AFOs in Each Category

Custom fabricated to patient model	73%
Custom fabricated to patient measurement	9%
Custom fit (pre-fabricated devices)	18%

Table 26 documents that *custom* AFOs are most likely made of thermoplastic materials (83%) and less likely to be made of carbon fiber (13%) or any other material.

Table 26

Percentage of Custom AFOs in Each Category

Thermoplastic	83%
Carbon fiber	13%
Other	4%

On the other hand, *custom fit prefabricated* AFOs are most likely to be carbon fiber (72%) and less like to be thermoplastic (27%).

Table 27

Percentage of Prefabricated AFOs in Each Category

Thermoplastic	27%
Carbon fiber	72%
Other	1%

Finally, as documented in Table 28, Certified Orthotists reported that 18% of their AFO fittings use the AFO tuning method as published by Owen/Meadow.

Table 28

Percentage of AFO Fittings Utilizing the AFO Footwear Combination/SVA/Tuning Method as Described by Owen/Meadows

AFO fittings using tuning method	18%
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Table 29 documents that spinal orthoses are somewhat more likely to be custom fit (pre-fabricated devices) (40%) than either custom fabricated to patient measurement (35%) or custom fabricated to patient model (25%).

Table 29

Percentage of Spinal Orthoses in Each Category

Custom fabricated to patient model	25%
Custom fabricated to patient measurement	35%
Custom fit (pre-fabricated devices)	40%

The results showed that about three fourths of all scoliosis patients wear their orthoses full time.

Table 30

Percentage of Scoliosis Orthoses in Each Category

Nocturnal	24%
Full time	76%

Certified Practitioners who spend a majority of their time providing orthotic-related services indicated that they perform all seven types of tasks in connection with lower extremity, spinal, scoliosis, upper extremity orthosis, cranial and other types of orthoses (see Table 31). As might be expected, they are most likely to indicate performing these tasks in connection with the classes of orthoses to which they allocate the most time. Accordingly, few Certified Orthotists indicated they fabricate either spinal orthoses such as SEWHO, SOs or any cranial orthoses. On the other hand, more than 95% of the respondents indicated that they perform the initial patient evaluation for each and every category of orthosis. The percentage of respondents performing specific tasks (for example, measure/mold/trace/digitize/scan, modify/repair/replace) varies within and across practice areas).

Table 31

Percentage Performing Each Activity with Respect to Orthoses

	Perform initial patient evaluation	Measure/ mold/ trace/ digitize/ scan	Modify model/ image/ tracing	Fabricate	Fit patient	Re- evaluate patient	Modify/ repair/ replace
Lower Extremity							
Orthopedic/ diabetic shoes	98%	88%	34%	18%	96%	87%	84%
Custom shoes	98%	95%	22%	7%	95%	88%	79%
Shoe modifications	95%	69%	36%	50%	90%	82%	77%
FO	99%	95%	63%	48%	98%	91%	88%
Partial foot insert	99%	94%	60%	45%	97%	90%	86%
Foot abduction orthosis/ Denis Browne/ Ponseti	96%	84%	21%	14%	95%	82%	78%
SMO	99%	95%	52%	29%	97%	91%	88%
AFO	99%	95%	68%	45%	98%	93%	93%
FES	95%	65%	24%	9%	82%	80%	70%
KO	98%	95%	32%	13%	98%	89%	85%
KAFO	98%	95%	56%	32%	96%	92%	90%
HO	97%	89%	26%	11%	97%	85%	82%
HKAFO/RGO	95%	87%	39%	19%	90%	87%	84%
Dynamic contracture	97%	89%	35%	16%	92%	84%	74%

	Perform initial patient evaluation	Measure/mold/trace/digitize/scan	Modify model/image/tracing	Fabricate	Fit patient	Re-evaluate patient	Modify/repair/replace
Spinal							
LSO semi-rigid	99%	93%	19%	6%	99%	85%	80%
LSO rigid	98%	95%	28%	14%	98%	87%	84%
TLO (including Jewett or CASH)	98%	92%	20%	5%	98%	84%	83%
TLSO	98%	96%	37%	18%	98%	90%	90%
CTLSO	94%	90%	29%	12%	96%	87%	87%
CTO/HCO (including Minerva)	96%	87%	20%	7%	96%	86%	83%
CO	98%	87%	17%	6%	97%	83%	80%
Halo	87%	75%	14%	4%	86%	78%	76%
Scoliosis Orthoses							
LSO	98%	94%	29%	14%	97%	88%	89%
TLSO	98%	95%	34%	18%	96%	90%	91%
CTLSO (Milwaukee)	87%	85%	36%	17%	89%	84%	88%
Upper Extremity Orthoses							
HO	98%	92%	24%	16%	97%	83%	78%
WHFO	98%	92%	32%	20%	98%	85%	83%
WHO	98%	91%	25%	15%	97%	84%	80%
EWHO	96%	89%	26%	14%	97%	83%	81%
EO	98%	91%	24%	11%	97%	83%	79%
SEWHO	95%	87%	24%	8%	94%	81%	78%
SO	96%	89%	15%	4%	96%	79%	74%
Dynamic contracture orthosis	97%	92%	28%	13%	95%	85%	82%
Humeral fracture orthosis	97%	92%	25%	12%	97%	83%	82%
Elbow fracture orthosis	96%	87%	26%	11%	96%	81%	79%

	Perform initial patient evaluation	Measure/ mold/ trace/ digitize/ scan	Modify model/ image/ tracing	Fabricate	Fit patient	Re- evaluate patient	Modify/ repair/ replace
Cranial Orthoses							
Protective soft helmet	98%	89%	13%	2%	98%	76%	71%
Protective rigid helmet	97%	90%	19%	6%	97%	78%	78%
Cranial remolding orthosis	96%	93%	27%	5%	93%	92%	91%
Other orthoses							
Protective or burn facemask	96%	89%	50%	31%	91%	82%	80%
Dynamic chest compression or Pectus carinatum orthosis	95%	92%	28%	16%	94%	87%	85%
Compression garments and wraps	98%	93%	12%	2%	96%	79%	63%
Therapeutic postural-control orthoses (Theratogs, Wunzies)	98%	92%	14%	3%	90%	81%	70%

Prosthetic Practice Areas and Devices

As was the case with the results related to orthotics, the results of these rating activities should be reviewed very carefully, as they provide guidance with regard to the development and/or refinement of ABC's certification examinations.

Certified Prosthetists completed seven percentage allocation rating tasks related to the array of prosthetics they provide to their patients and/or to a description of the patients.

As displayed in Figure 2, of the 13 specifically enumerated practice areas, respondents spend the most time, 48%, in the transtibial practice area and about one half of that time, 25%, in the transfemoral practice area. They spend no more than 6% in any other practice area.

Figure 2 – Percentage of Time in Prosthetic Practice Areas

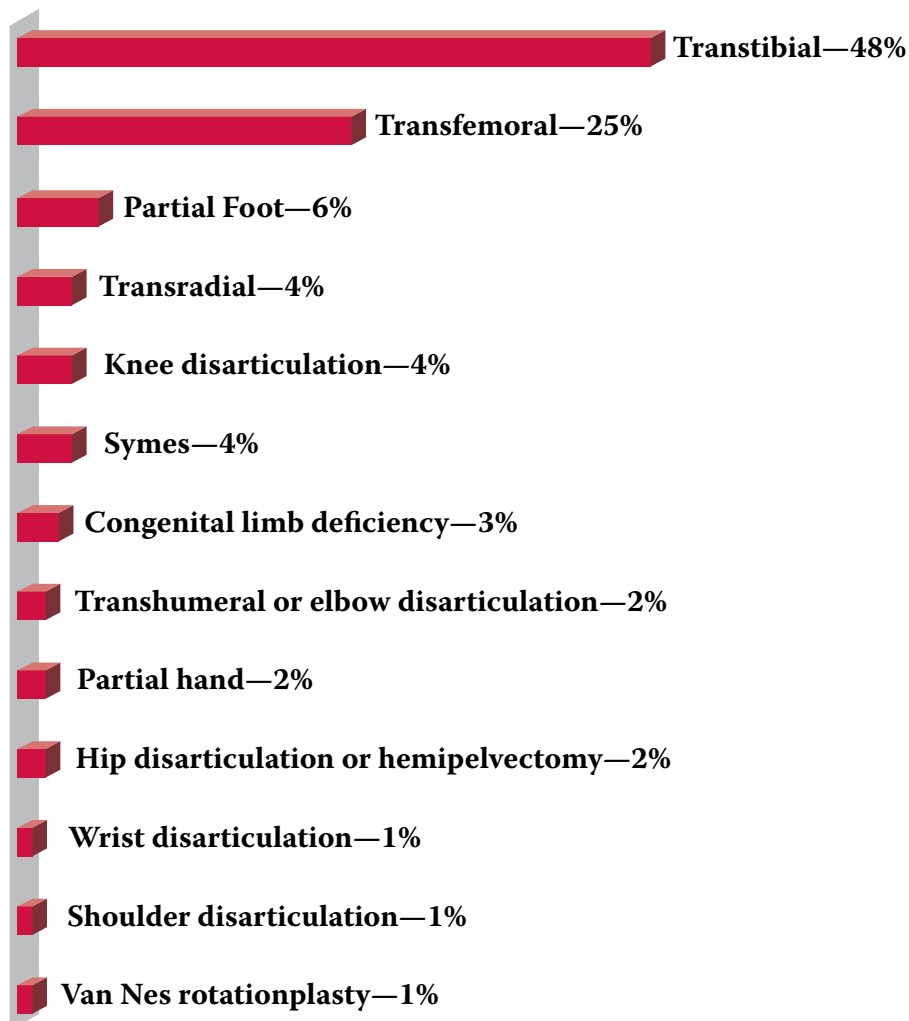


Table 32 provides additional detail about the practice areas in which the respondents spend time. That is, within the transtibial practice area, they are most likely to use hydrostatic sockets (employing locking mechanism) (21%) and only somewhat less likely to employ total surface bearing sockets (no locking mechanism employed) (19%). Within that practice area, about three fourths of the suspension systems selected are either roll-on liner with lock or lanyard (22%) or roll-on liner, suction with other accessories (seal or sleeve) (13%).

Nearly all of the socket systems used with transfemoral and knee disarticulation prosthetics are ischial containment (22%) and virtually all of the suspension systems are roll-on liner with lock or lanyard (13%), suction suspension with expulsion valve (7%), or roll-on liner, suction with other accessories (seal, sleeve) (6%).

Certified Prosthetists spend no more than a total of 5%, 2% and 4% of their time, respectively, in connection with transradial and wrist disarticulation, transhumeral and elbow disarticulation and Symes prostheses. The biggest change from 2006 was in the Other (partial foot, disarticulations) area. Certified Prosthetists reported that they spent 14% of their time in the Other area, compared to only 6% in 2006. This may explain why the Transtibial area decreased from 54% to 48% in this analysis.

Table 32

Prosthetic Practice Areas, Sockets, Control Systems and Suspensions

Practice Area	% of Practice			
	Prostheses A	Sockets B	Control systems C	Suspensions D
Transtibial	48%			
Patella tendon bearing		8.5%		
Total surface bearing (no locking mechanism employed)		18.7%		
Hydrostatic (employing locking mechanism)		20.5%		
Supracondylar or anatomical				2.3%
Joints and corset				1.0%
Waist belt only				0.3%
Sleeve only				3.8%
Roll-on liner with lock or lanyard				21.7%
Roll-on liner, suction with other accessories (seal or sleeve)				12.9%
Vacuum-assisted				5.8%

Practice Area	% of Practice			
	Prostheses A	Sockets B	Control systems C	Suspensions D
Transfemoral and Knee Disarticulation	29%			
Distal end bearing		1.4%		
Quadrilateral		2.0%		
Ischial containment		21.5%		
Ramal containment (for example, M.A.S. design)		1.4%		
Sub-ischial		2.0%		
Hip joint/pelvic band/waist belt				0.8%
Suction suspension with expulsion valve				7.1%
Roll-on liner with lock or lanyard				12.5%
Roll-on liner, suction with other accessories (seal, sleeve)				5.7%
Vacuum-assisted				1.4%
Self-suspending				0.8%
Transradial and Wrist Disarticulation	5%			
Passive and/or aesthetic			0.6%	
Body-powered			2.6%	
Myoelectric			1.6%	
Harness				2.1%
Suction suspension with expulsion valve				0.5%
Roll-on liner with lock or lanyard				0.7%
Roll-on liner, suction with other accessories (seal, sleeve)				0.2%
Vacuum-assisted				0.0%
Self suspending				1.2%

Practice Area	% of Practice			
	Prostheses A	Sockets B	Control systems C	Suspensions D
Transhumeral and Elbow Disarticulation	2%			
Passive and/or aesthetic			0.2%	
Body-powered			1.1%	
Myoelectric			0.4%	
Hybrid, myo/body-powered			0.4%	
Harness				1.4%
Roll-on liner with lock				0.4%
Roll-on liner, suction with other accessories (seal, sleeve)				0.2%
Vacuum-assisted				0.0%
Symes	4%			
Patella tendon bearing		1.5%		
End bearing.		2.2%		
Self-suspending (via pad or soft insert)				1.5%
Removable window/door				1.4%
Expandable wall				0.4%
Roll-on liner with expulsion valve				0.4%
Other (partial foot, disarticulations and other amputation levels)	14%			

Table 33 presents information about the percentages of respondent's patients at each functional level. The majority of patients are classified as functioning at the K2 (36%) or K3 (46%) level.

Table 33
Percentage of Lower Extremity Patients at Each Functional Level

K1	8%
K2	36%
K3	46%
K4	10%

In regard to the types of prosthetic feet and prosthetic knees selected, Table 34 documents that one half of all prosthetic feet comprise dynamic response, including multi-axis and shank foot systems (50%), and fewer than one fourth are flexible keel (22%).

Table 34

Percentage of Prosthetic Feet in Each Category

SACH	8%
Single axis	6%
Flexible keel	22%
Dynamic response, including multi-axis and shank foot systems	50%
Hydraulic	6%
Microprocessor controlled, powered foot and ankle systems	3%
Running/sports	4%
Other	1%

Table 35 documents that four types of knees are generally selected: weight activated stance control (24%), polycentric (with and without fluid control) (23%), fluid control (20%) and microprocessor (19%).

Table 35

Percentage of Prosthetic Knees in Each Category

Manual lock	8%
Single axis constant friction	4%
Weight activated stance control	24%
Polycentric (with and without fluid control)	23%
Fluid control	20%
Microprocessor	19%
Powered	1%
Other	1%

Table 36 documents the percentage of terminal devices by category. Nearly one half can be categorized as body powered hook (45%), whereas 16% are externally powered hand, 12% body powered hand and 10% multi-articulated.

Table 36

Percentage of Terminal Devices in Each Category

Body powered hook	45%
Externally powered hook	8%
Body powered hand	12%
Externally powered hand	16%
Multi-articulated (for example, I-Limb, Bebionic)	10%
Activity specific (for example, sports, vocational)	6%
Other	3%

Respondents indicated that they spend about 10% of their clinical patient care and/or fabrication-related time performing pre-operative consultations.

Table 37

Percentage of Clinical Patient Care and/or Fabrication-Related Time Spent Performing Prosthetic Pre-Operative Consultations

Percentage of time performing pre-operative consultations	10%
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As documented in Table 38, Certified Prosthetists indicated that they perform nearly all tasks in connection with the 13 specifically delineated types of prosthetic devices. As described previously in regard to the pattern of ratings for orthotic credentialed respondents, the respondents were most likely to indicate performing these tasks in connection with the classes of prostheses to which they allocate the most time. Accordingly, many Certified Prosthetists indicated that they perform all seven types of tasks associated with transtibial and transfemoral prostheses, and many fewer Certified Prosthetists indicated that they perform fabrication tasks associated with partial hand.

Table 38

Percentage Performing Each Activity with Respect to Prostheses

	Perform initial patient evaluation	Measure/ mold/ trace/ digitize/ scan	Modify model/ image/ tracing	Fabricate	Fit patient	Re-evaluate patient	Modify/ repair/ replace
Partial foot	97%	93%	76%	45%	95%	88%	81%
Symes	95%	92%	86%	40%	93%	90%	87%
Transtibial	98%	98%	96%	57%	97%	96%	94%
Van Ness rotationplasty	76%	61%	61%	36%	62%	76%	78%
Knee disarticulation	94%	90%	88%	40%	91%	92%	87%
Transfemoral	98%	97%	94%	53%	98%	96%	94%
Hip disarticulation or hemipelvectomy	84%	74%	68%	34%	74%	79%	79%
Partial hand	94%	80%	58%	26%	74%	71%	62%
Wrist disarticulation	93%	83%	77%	40%	80%	82%	82%
Transradial	92%	87%	83%	45%	89%	90%	86%
Transhumeral or elbow disarticulation	89%	79%	76%	39%	81%	83%	84%
Shoulder disarticulation	82%	71%	66%	34%	75%	79%	78%
Congenital limb deficiency	94%	88%	84%	47%	86%	89%	88%

Highlights Related to Professional Background, Work Setting and Demographic Information

- About 73% of the orthotic credentialed sample had 11 or more years of experience in orthotics, and 68% of the prosthetic credentialed sample had 11 or more years of experience in prosthetics.
- About 70% of the Certified Practitioners in orthotics and prosthetics earned a baccalaureate degree in O/P or a baccalaureate degree and an O/P post-graduate certificate to initially qualify for practice.
- Members of the orthotic and prosthetic credentialed samples supervised an array of other personnel. Certified Practitioners in both the orthotic and prosthetic certified samples were most likely to supervise other certified clinicians, certified and non-certified technicians and other support staff.
- The largest percentage of patients of both credentialed samples present with conditions that reflect the rehabilitative phase of care, although the percentage is higher for prosthetic practitioners than orthotic practitioners (47% versus 39%, respectively). Both disciplines see patients next most frequently with conditions in the chronic phase of care (37% for orthotics, 33% for prosthetics), and least in the acute phase of care (24% for orthotics, 20% for prosthetics).
- Regarding the etiology of the conditions, nearly two thirds of prosthetic patients (66%) present with disease, while less than half of orthotic patients (44%) do so. About one quarter of patients in each discipline present with trauma. A large difference was found regarding congenital etiologies; 30% of orthotic patients, but only 9% of prosthetic patients are in this category.
- Respondents were asked to indicate the percentage of orthotic and prosthetic devices they provide to their patients that incorporate the use of computer-aided design and manufacturing (CAD/CAM). Members of the orthotic credentialed sample indicated that about 18% of the devices they provide incorporate the use of CAD/CAM, whereas members of the prosthetic credentialed sample indicated that 23% of the devices they provide incorporate the use of CAD/CAM.
- Somewhat over half of all orthotic devices provided to patients are fabricated onsite (57%) with the remainder outsourced. Prosthetic devices are somewhat more likely to be fabricated onsite (69%).

Highlights Related to Domains, Tasks, Knowledge and Skills and Orthotic and Prosthetic Devices

- Certified Orthotists indicated that they spend the most time performing tasks associated with *Patient Assessment* (24%) while Certified Prosthetists spent the most time in *Implementation of the Treatment Plan* (24%). Respondents from both disciplines spent the least amount of time performing tasks associated with *Promotion of Competency* and *Enhancement of Professional Practice* (about 7.5 % regardless of discipline).
- With only two exceptions, the *Criticality* ratings for Certified Practitioners in both disciplines are very similar; that is, within 0.3 of a rating scale point (*Provide patient with preparatory care for orthotic/prosthetic treatment* and *Modify the patient model/digital image for fabrication* were considered somewhat more critical by prosthetists than by orthotists). Certified Practitioners rated all tasks as moderately-to-very critical.
- The overall pattern of the *Frequency* and *Criticality* ratings on the tasks indicates that the practice analysis delineation included critical tasks performed by Certified Practitioners in both disciplines. The pattern of *Frequency* and *Criticality* ratings for the Certified Practitioners in both disciplines validates the use of these tasks in initiatives related to examination development.
- *Criticality* ratings for 76 of the 81 knowledge and skill statements indicate that these knowledge and skills are moderately-to-highly critical in regard to optimizing outcomes for patients, caregivers and healthcare providers. The ratings for the remaining five statements indicate that those bodies of knowledge or skills are minimally-to-moderately critical.
- In the case of the orthotic credentialed sample of Certified Practitioners, a simple majority (>50%) of respondents supported the acquisition of the knowledge and skills in 72 of the 81 statements primarily *before* passing the ABC examinations. Using a similar criterion for the prosthetic credentialed sample of Certified Practitioners, knowledge and skills for 71 of the 81 statements were supported for acquisition primarily *before* passing the ABC examinations.
- Certified Orthotists spend more than one half of their time (59%) performing tasks

in connection with lower extremity orthoses. Of that time, they spend about 18% performing tasks in connection with AFOs, and somewhat less time performing tasks in connection with FOs (8%) and orthopedic/diabetic shoes (7%). Certified Orthotists spend about 16% of their time performing tasks in connection with spinal orthoses, most typically with TLSOs (5%) and LSOs, semi-rigid (4%). Certified Orthotists spend generally equal amounts of time performing tasks in connection with either scoliosis-related orthoses or upper extremity orthoses (8% in each area). Time spent in regard to scoliosis-related orthoses is most likely to be spent with TLSOs, and time spent in regard to upper extremity orthoses is most likely to be spent with WHOs. Certified Orthotists also spent about 8% of their time with cranial orthoses.

- Certified Prosthetists spend almost half of their time performing tasks associated with transtibial prostheses (48%), with most prostheses typically incorporating hydrostatic sockets and roll-on suspension systems. Certified Prosthetists spend more than one fourth of their work time performing tasks associated with transfemoral prostheses (29%), with most typically incorporating ischial containment sockets and roll-on with locking mechanism suction with suspensions. Certified Prosthetists spend no more than a total of 5%, 2% and 4% of their time, respectively, in connection with transradial, transhumeral and Symes prostheses.

ABC is the comprehensive credentialing organization whose mission is to establish and advocate for the highest patient care and organizational standards in the provision of safe and effective orthotic, prosthetic and pedorthic services.

ABC fulfills this mission by:

- **Measuring patient care provider's knowledge and skills through rigorous credentialing programs**
- **Establishing standards of organizational performance through facility accreditation**
- **Mandating professional continuing education to maintain competency**
- **Administering a professional discipline program**
- **Communicating the value and importance of ABC credentials.**

ABC's activities are guided by the following vision statement.
Setting Standards, Improving Outcomes, Changing Lives

**American Board for Certification
in Orthotics, Prosthetics & Pedorthics, Inc.**



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