

# **Practice Analysis of Certified Practitioners in the Disciplines of Orthotics and Prosthetics**



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

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## Acknowledgements

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On behalf of the American Board for Certification in Orthotics, Prosthetics and 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. It represents the culmination of a year of planning, execution, data analyses and writing.

A project of this magnitude depends on the hard work and commitment of many professionals, and I am pleased to acknowledge their contributions. We are indebted to the eight-member ABC Practice Analysis Task Force—Michael J. Allen, CPO, FAAOP; William J. Barringer, CO, FAAOP; William D. Beiswenger, CPO, FAAOP; Michael D. Brncick, CPO; Timothy D. Bulgarelli, CPO; Carol J. Hentges, CO; and Robert S. Lin, CPO, FAAOP—for the wisdom and direction they provided. The chairman of the task force, Steven R. Whiteside, CO, FAAOP, worked tirelessly to provide conceptual guidance regarding the conduct of the study 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, Executive Director of ABC, for serving as the liaison between the task force and the staff at Professional Examination Service. She provided thoughtful and consistent support for the study and developed a highly effective communications program regarding the conduct of the study.

Stephen B. Fletcher, CPO  
President

## Introduction

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The American Board for Certification in Orthotics, Prosthetics and Pedorthics, Inc. (ABC), contracted with Professional Examination Service (PES) 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, PES worked with a Practice Analysis Task Force and ABC's Executive Director over the course of a one-year project.

ABC performed practice analysis and validation studies in 1990 and 1999. In 2006, as planned, the profession was resurveyed in order to identify changes in the profession related to the delivery of care, the components available and the technology in use today.

The use of electronic delivery and data collection made the current study easier to design and implement. While remaining a comprehensive survey, the use of electronic systems instead of paper and pencil allowed for a larger participant sample, gave us greater flexibility and made it easier for respondents to participate.

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 standard setting organizations.

### **Why do a practice analysis study?**

The goal of the practice analysis is to determine current trends in patient care, technology and practice management in the provision of prosthetic and orthotic services by ABC credentialed practitioners.

### **Why do a validation study?**

The goal of the validation study was to identify priorities unique in the delivery of orthotic and prosthetic patient care, e.g., What highly critical tasks are performed by all practitioners? What subset of knowledge and skills is essential at the time of initial credentialing? Which procedures are most frequently implemented?

### **What will ABC do with the results of the study?**

The results are being used to generate defensible credentialing test specifications designed for entry-level orthotic and prosthetic practitioners. The results will also be used to identify specific topics for in-service and/or continuing education and to provide guidance to NCOPE for residency and educational program enhancement in regard to curriculum review and/or programmatic self-assessment.

## Executive Summary

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The specific objectives of the study were to:

- update 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;
- describe the demographic and professional characteristics of the respondents with regard to experience, education and work setting;
- identify differences in the disciplines of orthotics and prosthetics with regard to areas of treatment;
- quantify time spent and tasks performed within the domains of practice regarding patient care, various orthotic and prosthetic devices and practice management;
- describe—in terms of age and etiology—the patients to whom ABC orthotic and prosthetic credentialed practitioners provide direct patient care; and
- develop defensible test specifications for the disciplines of orthotics and prosthetics in connection with the multiple-choice, simulation and/or clinical practical examinations for practitioner candidates.

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

- Conducted two meetings of the task force
- Revised the delineation
- PES developed an online survey of practice, the *Practice Analysis Survey of Certified Practitioners in the Disciplines of Orthotics and Prosthetics*, which included the following components:

An Introduction, including a description of the purpose of the survey and instructions for completing and returning the survey.

Section 1: Orthotics and Prosthetics Device Lists, including activities performed in connection with orthotic and prosthetic devices.

Section 2: Tasks, including 57 tasks delineated in association with six domains of practice.

Section 3: Knowledge and Skills, including 74 knowledge and skill statements delineated in association with six domains of practice.

Section 4: Domains, including six domains of practice.



Section 5: Background Information, including questions about the respondent's educational and professional background, work setting, supervisory responsibilities, patient base and demographic characteristics.

Section 6: Comments, including open-ended questions regarding the comprehensiveness of the draft delineation, changes in practice and the benefits of ABC certification.

- Analyzed the data, developed a description of practice and developed empirically derived test specifications.

## Survey Return Rate

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The overall return rate was 32%. The return rate was derived by taking the number of completed surveys received and dividing it by the number of surveys eligible to be completed. The number eligible was defined as the total number of surveys mailed, minus those that were not deliverable. The sample included 2578 Certified Practitioners and 718 completed the survey, for an overall return rate of 32%. This response rate is 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.

For the purposes of the data analyses related to both the delineation and the practice areas, dually credentialed professionals were identified as members of the discipline-specific sample in which they reported spending the most time.

## 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 and then addressed the respondent's 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 consistent with the ABC database.

Comparatively, the 1999 survey indicated a female population of 12% in orthotics and 7% in prosthetics. The ethnic background sample in 1999 showed a slightly higher percentage of Caucasian/White (non-Hispanic) with 92% in orthotics and 95% in prosthetics.

**Table 1**  
**Gender of Respondents**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
Female	22%	13%
Male	78%	87%
<b>Total</b>	<b>100%</b>	<b>100%</b>

**Table 2**  
**Age of Respondents**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
25 – 34	22%	18%
35 – 44	29%	25%
45 – 54	31%	35%
55 – 64	16%	20%
65 or over	2%	2%
<b>Total</b>	<b>100%</b>	<b>100%</b>

**Table 3**  
**Racial/Ethnic Background of Respondents**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
American Indian/Eskimo/Aleut	1%	1%
Asian or Pacific Islander	3%	1%
African American/Black	1%	1%
Caucasian/White (non-Hispanic)	90%	93%
Hispanic	3%	1%
Multiracial	1%	2%
Other	1%	1%
<b>Total</b>	<b>100%</b>	<b>100%</b>

Seventy-four % of the Certified Practitioners in both disciplines earned a bachelor's degree in O/P or a bachelor's degree and an O/P certificate to initially qualify for ABC practitioner certification. (See Table 4.) Twelve % of the Certified Practitioners in orthotics and prosthetics, respectively, had earned an associate's degree.

Comparatively, the 1999 sample indicated about 72% and 73% of the Certified Practitioners in orthotics and prosthetics, respectively, earned a bachelor's degree in O/P or a bachelor's degree and an O/P certificate to initially qualify for ABC practitioner certification. Sixteen % and 12% of the Certified Practitioners in orthotics and prosthetics, respectively, had earned an associate's degree. The master's degree options were not on the 1999 survey, therefore comparative data is not available.

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

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
HS/GED and O/P short-term courses	5%	5%
HS/GED and O/P technician certificate	0%	0%
AA/AS	7%	5%
AA/AS in O/P	5%	7%
BS in O/P	23%	19%
BA/BS and O/P certificate	51%	55%
Master's Degree in O/P	0%	1%
Master's Degree (non O/P)	3%	4%
Other	6%	4%
<b>Total</b>	<b>100%</b>	<b>100%</b>

In regard to the highest education degree/certificate/diploma earned, 12% of the Certified Practitioners spending a majority of their time in orthotics earned a master’s degree or higher, while 13% of those spending a majority of their time in prosthetics earned a master’s degree or higher (see Table 5).

**Table 5**  
**Highest Education Degree/Certificate/Diploma Earned**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
HS/GED and O/P short-term courses	4%	3%
HS/GED and O/P technician certificate	0%	0%
AA/AS	6%	5%
AA/AS in O/P	4%	7%
BA/BS (non O/P)	11%	9%
BS in O/P	21%	15%
BA/BS and O/P certificate	40%	46%
Master’s Degree in O/P	1%	1%
Master’s Degree (non O/P)	10%	10%
Doctorate	1%	2%
Other	2%	2%
<b>Total</b>	<b>100%</b>	<b>100%</b>

As seen in Table 6, about 74% of the orthotic credentialed sample and 79% of the prosthetic credentialed sample had 10 or more years of experience. The Certified Practitioners spending the majority of their time in orthotics had about 18 years of experience, while those spending the majority of their time in prosthetics had about 19 years of experience.

**Table 6**  
**Years of Experience in Orthotic/Prosthetic Practice**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
5 or less	10%	9%
6 - 9	16%	12%
10 - 19	29%	29%
20 - 29	27%	34%
30 or more	18%	16%
<b>Total</b>	<b>100%</b>	<b>100%</b>

Certified Practitioners in orthotics devoted 55% of their work time to clinical orthotic patient care (40% in custom made/made to measure and 15% in off the shelf) and about equal amounts of time to administration (12%), fabrication (11%), and clinical prosthetic patient care (10%). Certified Practitioners in prosthetics devoted 45% of their work time to clinical prosthetic patient care and about equal amounts of time to prosthetic fabrication (13%) and administration (16%) (see Table 7).

Compared to the 1999 study, this data shows a slight increase in the percentage of time spent in clinical custom orthotic and prosthetic care, a decrease in the time spent in fabrication and education, and an increase in the work time spent in administration.

**Table 7**  
**Primary Work Performed**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
Clinical prosthetic patient care	10%	45%
Prosthetic fabrication	4%	13%
Clinical orthotic patient care (custom fabricated/made to measure)	40%	9%
Clinical orthotic patient care (off the shelf)	15%	5%
Orthotic fabrication	11%	3%
Mastectomy fitter	0%	0%
Education	7%	8%
Administration	12%	16%
Other	1%	1%
<b>Total</b>	<b>100%</b>	<b>100%</b>

In describing their primary work setting, 54% of the Certified Practitioners in orthotics worked in a privately owned (37%) or publicly owned (17%) multifacility orthotic and prosthetic service organization, 21% worked in a single-location facility (privately owned), and 17% worked in a hospital-based practice.

In regard to the Certified Practitioners in prosthetics, 53% worked in either a privately owned (34%) or publicly owned (19%) multifacility orthotic and prosthetic service organization, 25% worked in a single-location facility (privately owned) and 13% worked in a hospital-based practice (see Table 8).

The 1999 survey indicated that 57% of the Certified Practitioners in orthotics and 69% of the Certified Practitioners in prosthetics reported working in either a privately owned or publicly owned multi-facility orthotic and prosthetic service organization. The percentage of Certified Practitioners in orthotics who reported working in a single-location facility (privately owned) has remained unchanged at 21%, while the Certified Practitioners in prosthetics who reported working in a single-location facility (privately owned) has increased from a previous 18%. Hospital based employment rose from a previous reporting of 13% for orthotics and 8% for prosthetics.

**Table 8**  
**Primary Work Setting**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
Part of a multi-facility orthotic and prosthetic service organization, publicly owned	17%	19%
Part of a multi-facility orthotic and prosthetic service organization, privately owned	37%	34%
Single-location facility, privately owned	21%	25%
Central fabrication center, privately owned	1%	2%
Hospital-based practice	17%	13%
University-based practice	4%	5%
Other	3%	2%
<b>Total</b>	<b>100%</b>	<b>100%</b>

As documented in Table 9, respondents described the settings wherein they delivered direct patient care. Certified Practitioners who spent the majority of their time in orthotics were most likely to deliver direct patient care in an office (60%). Approximately 16% of the sample delivered direct patient care in an acute-care hospital setting, while 11% delivered direct patient care in a specialty clinic. Members of the prosthetic credentialed sample were somewhat more likely to deliver direct patient care in an office (66%) and less likely to deliver direct patient care in any of the other specifically delineated locations.

The 1999 survey showed a slightly less percentage of Certified Practitioners in both orthotics and prosthetics in specialty clinics (10% and 3% respectively) and acute-care hospital settings (15% and 9% respectively).

**Table 9**  
**Direct Patient-Care that Occurred in Various Settings**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
Office	60%	66%
Specialty clinic (e.g., neuromuscular, cerebral palsy, spina bifida)	11%	5%
Acute-care hospital setting	16%	10%
Long-term care facility (e.g., nursing home, assisted living facility)	5%	8%
Stand-alone rehabilitation facility	6%	7%
Patient home	1%	3%
Any other facility	1%	1%
<b>Total</b>	<b>100%</b>	<b>100%</b>

In regard to the number of orthotics/prosthetics employees at the respondents' primary work setting, about 60% of the members of both the orthotic and prosthetic credentialed samples work with between one and five employees. Twenty % and 23% of the Certified Practitioners in orthotics and prosthetics, respectively, work with between six and 10 employees, and the remaining respondents work with 11 or more employees (see Table 10).

**Table 10**  
**Number of Orthotic/Prosthetic Employees at Primary Work Setting**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
1 – 5	61%	60%
6 – 10	20%	23%
11 – 15	10%	10%
16 or more	9%	7%
<b>Total</b>	<b>100%</b>	<b>100%</b>

As seen in Table 11, regardless of discipline, respondents were most likely to supervise from one to five other patient-care providers. On the other hand, Certified Practitioners spending the majority of their time in orthotics supervised an average of five other patient-care providers, while Certified Practitioners spending the majority of their time in prosthetics supervised an average of three other patient-care providers.

**Table 11**  
**Number of Patient-Care Providers Directly Supervised**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
1 – 5	79%	80%
6 –10	13%	13%
11 – 15	4%	6%
16 or more	4%	1%
<b>Total</b>	<b>100%</b>	<b>100%</b>

Respondents described the patients to whom they delivered direct patient care. As documented in Table 12, slightly more than one-third of the patients of the orthotic credentialed sample were adult patients (37%), one-third were pediatric patients (33%), and slightly less than one-third of the patients were geriatric patients (30%). In contrast, nearly one-half of the patients of the prosthetic credentialed sample were geriatric patients (46%), more than one-third were adult patients (43%), and few were pediatric patients (11%).

**Table 12**  
**Age Ranges of Patients**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
Pediatric	33%	11%
Adult	37%	43%
Geriatric	30%	46%

As documented in Table 13, one-half of the patients of the orthotic credentialed sample present with conditions that reflect disease-based etiologies, and about one-fourth of the patients present with conditions that reflect trauma-based (26%) or congenital-based (24%) etiologies. In contrast, about two-thirds of the patients of the prosthetic credentialed sample present with conditions that reflect disease-based etiologies (67%), and few present with conditions that reflect trauma-based (24%) or congenital-based (9%) etiologies.

Comparatively, the 1999 survey indicated similar numbers with the orthotic credentialed sample (46% disease-based, 28% trauma-based, 26% congenital-based) and with the prosthetic sample (67% disease-based, 23% trauma-based, 10% congenital-based).

**Table 13**  
**Percentage of Patients in Each Etiological Category**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
Disease	50%	67%
Trauma	26%	24%
Congenital	24%	9%



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 only about 16% of the devices they provide incorporate the use of CAD/CAM, whereas members of the prosthetic credentialed sample indicated that 24% of the devices they provide incorporate the use of CAD/CAM (see Table 14).

**Table 14**  
**Orthotic and Prosthetic Devices which Incorporated the Use of CAD/CAM**

<b>Sample</b>	<b>% of Orthotic and Prosthetic Devices</b>
Orthotics	16%
Prosthetics	24%

As can be seen in Table 15, members of both the orthotic and prosthetic credentialed samples report that more than two-thirds of all orthotic devices they provide to their patients are fabricated on site and about one-third are outsourced.

**Table 15**  
**Orthoses Fabricated On site and Outsourced**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
On site	70%	67%
Outsourced	30%	33%

As documented in Table 16, members of both samples report that more prosthetic devices they provide to their patients are fabricated on site and slightly less are outsourced. Prosthetic devices are somewhat more likely to be fabricated on site by members of the prosthetic credentialed sample.

**Table 16**  
**Prostheses Fabricated On site and Outsourced**

	<b>Orthotic Practitioners</b>	<b>Prosthetic Practitioners</b>
On site	73%	79%
Outsourced	27%	21%

## 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 17.

**Table 17**  
**Domains and Tasks**

<b>Domain</b>	<b>Number of Tasks</b>
Patient Assessment	6
Formulation of the Treatment Plan	8
Implementation of the Treatment Plan	18
Follow Up to the Treatment Plan	15
Practice Management	5
Promotion of the Competency and Enhancement of Professional Practice	5
<b>Total</b>	<b>57</b>

Seventy-four knowledge and skill statements were developed for the current practice analysis.

## 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 past year?
- **Criticality:** How critical is this domain to optimizing outcomes for patients, caregivers, and health care providers?

Table 18 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 they spend the most time performing tasks associated with Implementation of the Treatment Plan (25% and 29% for Certified Practitioners who spend a majority of their time in orthotics and prosthetics, respectively) and the least time performing tasks associated with Promotion of Competency and Enhancement of Professional Practice (about 8% regardless of discipline). They spend between 12% and 23% of their time performing tasks associated with each of the remaining four specifically delineated domains.

The mean Criticality ratings for the four domains related to direct patient care indicate 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 these two domains are also moderately to highly critical (3.1 to 3.4). Accordingly, all six domains appropriately focus on activities critical to optimizing outcomes for patients, caregivers, and health care providers.

**Table 18**  
**Descriptive Statistics for Domains**  
**Mean for Percentage of Time and Mean for Criticality**

Domain	% of Time <sup>1</sup>		Criticality <sup>2</sup>	
	O	P	O	P
<b>Patient Assessment</b> Perform a comprehensive assessment of the patient to obtain an understanding of the patient's orthotic/prosthetic needs	22.7%	17.0%	3.9	3.9
<b>Formulation of the Treatment Plan</b> Analyze and integrate information from patient assessment to create a comprehensive orthotic/prosthetic treatment plan to meet the needs and goals of the patient	15.8%	13.5%	3.8	3.9
<b>Implementation of the Treatment Plan</b> Perform the procedures necessary to provide the appropriate orthotic/prosthetic services, including fabrication	24.6%	28.8%	3.7	3.8
<b>Follow-up Treatment Plan</b> Provide continuing patient care and periodic evaluation to assure/maintain/document optimal fit and function of the orthosis/prosthesis	14.8%	17.2%	3.6	3.7
<b>Practice Management</b> Develop, implement, and/or monitor policies and procedures regarding human resources, the physical environment, business and financial practices, and organizational management	12.1%	13.1%	3.1	3.3
<b>Promotion of Competency and Enhancement of Professional Practice</b> Participate in personal and professional development through continuing education, training, research, and organizational affiliations	8.0%	8.4%	3.3	3.4
<b>Other</b>	2.0%	2.0%	3.0	3.2

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

<sup>2</sup> 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

All survey respondents rated the 57 tasks on two rating scales:

- Frequency: How frequently did you perform the task during the past year?
- Criticality: How critical is the task to optimizing outcomes for patients, caregivers, and health care providers?

Table 19 displays the mean Frequency and Criticality ratings for Certified Practitioners in both disciplines. As can be seen, with only four exceptions, the Frequency ratings for Certified Practitioners in both orthotics and prosthetics are similar; they do not vary by more than 0.3 of a rating scale point. Regardless of discipline, the ratings indicate Certified Practitioners perform 43 of the 47 tasks associated with the four direct patient care domains frequently to routinely. They perform the remaining six tasks in those same domains occasionally to frequently.

Certified Practitioners perform the tasks associated with one of the two remaining domains (Practice Management) frequently to routinely and the tasks associated with the remaining domain (Promotion of Competency and Enhancement of Professional Practice) somewhat less frequently. A review of those three tasks associated with lower frequency ratings indicates these tasks do not readily lend themselves to frequent performance (e.g., Conduct or participate in product development research, clinical trials, and outcome studies).

In only four instances did the Frequency ratings of the Certified Practitioners in the disciplines of orthotics and prosthetics vary by more than 0.3 of a rating scale point. As might be anticipated, Certified Practitioners in prosthetics were more likely than Certified Practitioners in orthotics to:

- Provide patient with preparatory care for orthotic/prosthetic treatment (e.g., diagnostic splint, compression garment);
- Rectify and prepare patient model/image for fabrication;
- Assess patient's psychosocial status (e.g., family status, job, or caregiver), and note any changes; and
- Reassess patient knowledge of goals and objectives to ensure proper use of orthosis/prosthesis relative to modifications.

With only one exception, the Criticality ratings for Certified Practitioners in both disciplines are very similar; that is, within 0.3 of a rating scale point. Certified Practitioners rated all tasks as moderately to very critical.

In summary, the overall pattern of the Frequency and Criticality ratings on the tasks indicates 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 the development of primary education curriculum, continuing education programming, and credentialing examinations.

**Table 19**  
**Descriptive Statistics for Tasks**  
**Mean for *Frequency* and *Criticality***

Tasks	Frequency <sup>1</sup>		Criticality <sup>2</sup>	
	O	P	O	P
<b>Patient Assessment</b>				
Review patient's prescription/referral	3.9	3.8	3.9	3.9
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 allergies to materials, current medications), reimbursement status, patient expectations, patient compliance with ancillary care, results of diagnostic evaluations	3.4	3.6	3.6	3.7
Perform a diagnosis-specific functional clinical and cognitive ability examination that includes manual muscle testing, gait analysis, and evaluation of sensory function, range of motion, joint stability, and skin integrity	3.4	3.4	3.7	3.6
Consult with other health care providers and caregivers, when appropriate, about patient's condition in order to formulate a treatment plan	3.2	3.1	3.5	3.5
Verify patient care by documenting history, ongoing care, and follow-up, using established record-keeping techniques	3.7	3.8	3.7	3.8
Refer patient, if appropriate, to other health care providers for intervention beyond orthotic/prosthetic scope of practice	2.7	2.8	3.4	3.4
<b>Formulation of the Treatment Plan</b>				
Evaluate the findings to determine an orthotic/prosthetic treatment plan	3.6	3.7	3.7	3.8
Formulate treatment goals and expected orthotic/prosthetic outcomes to reduce pain, increase comfort, provide stability, prevent deformity, address aesthetic factors, and/or promote healing to enhance function and independence	3.7	3.6	3.8	3.7
Consult with physician/referral source/appropriately licensed health care provider to modify, if necessary, the original prescription and/or treatment plan	2.9	2.7	3.6	3.5
Identify design, materials, and components to support treatment plan	3.7	3.8	3.8	3.8
Develop a treatment plan based on patient needs, including patient education and follow-up	3.6	3.7	3.7	3.8

<sup>1</sup> How frequently did you perform the task during the past year?

1 = Never or rarely (quarterly), 2 = Occasionally (monthly), 3 = Frequently (weekly), 4 = Routinely (daily).

<sup>2</sup> How critical is this task to optimizing outcomes for patients, caregivers, and health care providers?

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

Tasks	Frequency <sup>1</sup>		Criticality <sup>2</sup>	
	O	P	O	P
Communicate to patient and/or caregiver about the recommended treatment plan and any optional plans, including disclosure of potential risks/benefits in orthotic/prosthetic care	3.7	3.6	3.8	3.8
Document treatment plan using established record-keeping techniques	3.7	3.7	3.8	3.8
Ensure patient or responsible parties are informed of their financial responsibilities (for example, insurance verification/authorization, deductibles, co-pays) as they pertain to proposed treatment plan	3.2	3.1	3.6	3.6
<b>Implementation of the Treatment Plan</b>				
Inform patient, family, and/or caregiver of the orthotic/prosthetic procedure, possible risks, and time involved in the procedure	3.6	3.6	3.6	3.6
Provide patient with preparatory care for orthotic/prosthetic treatment (e.g., diagnostic splint, compression garment)	2.5	3.1	3.0	3.6
Select appropriate materials/techniques in order to obtain a patient model/image	3.7	3.7	3.7	3.8
Prepare patient for procedure required to initiate treatment plan (e.g., measure, take impression, delineate, scan, digitize)	3.8	3.8	3.8	3.8
Perform procedure (e.g., measure, take impression, delineate, scan, digitize)	3.9	3.8	3.9	3.9
Refer to manufacturer's specifications and other technical resources regarding components/materials	3.1	3.3	3.5	3.6
Select appropriate materials and components for orthosis/prosthesis based on patient criteria to ensure optimum strength, durability, and function (e.g., ankle or knee joints, feet, knee units, lamination layups)	3.7	3.8	3.9	3.9
Prepare delineation/impression/template for modification/fabrication (e.g., prepare impression/reverse delineation, digitize)	3.3	3.5	3.6	3.7
Rectify and prepare patient model/image for fabrication	3.2	3.6	3.5	3.8
Fabricate/assemble orthosis/prosthesis in order to prepare for initial or diagnostic fitting and/or delivery	2.5	2.8	3.0	3.2
Assess device for structural safety and ensure manufacturers' guidelines have been followed prior to patient fitting/delivery (e.g., torque values, patient weight limits)	3.4	3.5	3.7	3.8
Assess/align orthosis/prosthesis for accuracy in sagittal, transverse, and coronal planes in order to provide maximum function/comfort	3.6	3.8	3.8	4.0
Ensure materials, design, and components are provided as specified in the treatment plan	3.7	3.7	3.8	3.8

Tasks	Frequency <sup>1</sup>		Criticality <sup>2</sup>	
	O	P	O	P
Complete fabrication process after achieving optimal fit and function of orthosis/prosthesis (e.g., convert test socket to definitive orthosis/prosthesis)	2.6	2.7	3.2	3.2
Educate patient and/or caregiver about the use and maintenance of the orthosis/prosthesis (e.g., wearing schedules, other instructions)	3.8	3.7	3.9	3.9
Re-assess orthosis/prosthesis for structural safety prior to patient delivery	3.6	3.6	3.7	3.8
Document treatment using established record-keeping techniques to verify implementation of treatment plan	3.8	3.7	3.8	3.8
Refer patient to appropriate health care providers (e.g., nurse practitioners, therapists) for necessary ancillary care	2.9	3.1	3.4	3.5
<b>Follow-up Treatment Plan</b>				
Obtain feedback from patient and/or caregiver to evaluate outcome (e.g., wear schedule/tolerance, comfort, perceived benefits, perceived detractors, ability to don and doff, proper usage and function, overall patient satisfaction)	3.3	3.4	3.6	3.7
Assess patient's function and note any changes	3.4	3.6	3.7	3.8
Assess patient's skin condition (e.g., integrity, color, temperature, volume) and note any changes	3.6	3.8	3.8	3.9
Assess patient's general health, height, and weight, and note any changes	3.1	3.4	3.4	3.6
Assess patient's psychosocial status (e.g., family status, job, or caregiver), and note any changes	2.6	3.0	3.1	3.3
Assess fit of orthosis/prosthesis with regard to strategic contact (e.g., multiple force systems, total contact) to determine need for changes relative to initial treatment goals	3.5	3.6	3.7	3.8
Assess fit of orthosis/prosthesis with regard to anatomical relationships to orthosis/prosthesis (e.g., trimlines, static/dynamic alignment) to determine need for changes relative to initial treatment goals	3.7	3.7	3.8	3.9
Assess patient's achievement of planned treatment outcomes	3.3	3.3	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	3.3	3.2	3.6	3.6
Make or supervise modifications to orthosis/prosthesis (e.g., relieve pressure, change range of motion, change alignment, change components, add pressure-sensitive pad)	3.5	3.5	3.8	3.8
Assess modified device for structural safety	3.4	3.5	3.7	3.8



Tasks	Frequency <sup>1</sup>		Criticality <sup>2</sup>	
	O	P	O	P
Evaluate results of modifications to orthosis/prosthesis, including static and dynamic assessment	3.5	3.7	3.7	3.9
Reassess patient knowledge of goals and objectives to ensure proper use of orthosis/prosthesis relative to modifications	3.2	3.4	3.5	3.6
Document all findings and actions and communicate with physicians, referral sources, appropriately licensed health care providers to ensure patient status is updated	3.2	3.2	3.5	3.5
Develop long-term follow-up plan	2.8	3.0	3.2	3.4
<b>Practice Management</b>				
Plan, implement, evaluate, and document policies and procedures in compliance with all applicable federal and state laws and regulations and professional and ethical guidelines (e.g., CMS, HIPPA, FDA, ADA, OSHA, ABC Code of Professional Responsibility)	3.0	2.9	3.5	3.6
Develop and implement personnel policies and procedures (e.g., benefits, training, incentives, staff recognition, regular performance evaluations)	2.4	2.2	3.2	3.1
Establish procedures for patient care that comply with current medical/legal requirements	2.9	2.8	3.6	3.6
Demonstrate proper documentation of patient history and financial records using established record-taking techniques	3.5	3.6	3.7	3.8
Create a professional, cooperative working environment to improve patient care	3.6	3.7	3.7	3.8
<b>Promotion of Competency and Enhancement of Professional Practice</b>				
Participate in continuing education and/or provide such education for other health care providers, orthotic and prosthetic practitioners, pedorthists, assistants, fitters, technicians, and office staff (e.g., publications, seminars, case studies)	2.8	2.9	3.6	3.6
Participate in education of residents, students and trainees	2.7	2.5	3.4	3.2
Conduct or participate in product development research, clinical trials, and outcome studies	1.6	1.7	3.0	3.0
Participate in the development, implementation, and monitoring of public policy regarding orthotics/prosthetics (e.g., provide testimony/information to legislative/regulatory bodies, serve on professional committees and regulatory agencies)	1.5	1.6	3.0	3.1
Participate in/with consumer organizations and nongovernmental organizations in order to promote competency and enhancement of orthotic/prosthetic profession	1.6	1.7	3.0	3.1

## Knowledge and Skill Statements

All survey respondents rated the 74 knowledge and skill statements on two rating scales:

- **Criticality:** How critical is this knowledge or skill to optimizing outcomes for patients, caregivers, and health care providers?

The Criticality ratings for 71 of the 74 statements indicate these knowledge and these skills are moderately to highly critical in regard to optimizing outcomes for patients, caregivers, and health care providers.

- **Acquisition:** At what point should this knowledge or skill be acquired by a Certified Practitioner?

The Acquisition rating scale is used to determine the point at which a knowledge or skill is required for practice. In the case of the orthotic credentialed sample of Certified Practitioners, a simple majority of respondents supported the acquisition of the knowledge and skills in 64 of the 74 statements primarily before passing the ABC examinations. Using a similar criterion for the prosthetic credentialed sample of Certified Practitioners, knowledge and skills for 61 of the 74 statements were supported for acquisition primarily before passing the ABC examinations.

## Knowledge and Skill Statements

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Knowledge of musculoskeletal anatomy, including upper limb, lower limb, spinal

Knowledge of neuroanatomy and neurophysiology

Knowledge of anatomical landmarks (surface anatomy)

Knowledge of kinesiology, including upper limb, lower limb, spinal

Knowledge of normal human locomotion

Knowledge of gait training

Knowledge of pathological gait

Knowledge of tissue characteristics/management

Knowledge of volumetric control

Knowledge of planes of motion

Knowledge of biomechanics

Knowledge of pathologies (e.g., muscular, neurologic, skeletal, vascular)

Knowledge of basic pharmacology

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## Knowledge and Skill Statements

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Knowledge of medical terminology

Knowledge of referral documents

Knowledge of procedures to record data

Knowledge of policies and procedures regarding privileged information

Knowledge of roles and responsibilities associated with other health care professions

Knowledge of reimbursement protocols (e.g., CMS, DMERC)

Knowledge of material safety procedures and standards (e.g., OSHA, MSDS)

Knowledge of universal precautions, including sterile techniques and infection control

Knowledge of ethical standards regarding proper patient management, including ABC Code of Professional Responsibility

Knowledge of scope of practice related to orthotic/prosthetic credentials

Knowledge of boundaries of the scope of practice (i.e., when to refer a patient to other health care providers/caregivers)

Knowledge of orthotic/prosthetic design

Knowledge of orthotic/prosthetic fitting criteria

Knowledge of clinical examination techniques, (e.g., range of motion (ROM), manual muscle tests, sensation, proprioception)

Knowledge of impression-taking techniques, materials, devices, and equipment

Knowledge of rectification/modification procedures as they relate to specific orthotic/prosthetic designs

Knowledge of measurement tools and techniques

Knowledge of orthotic/prosthetic forms (e.g., assessment, orthometry, measurement, evaluation, outcomes)

Knowledge of materials science

Knowledge of componentry

Knowledge of alignment devices and techniques

Knowledge of hand and power tools

Knowledge of mechanics (e.g., levers and force systems)

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## Knowledge and Skill Statements

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Knowledge of care and maintenance of orthoses/prostheses

Knowledge of computer-aided design and manufacturing (CAD/CAM)

Knowledge of item warranty and warranty limitations

Knowledge of loss control (e.g., risk management, inventory control)

Knowledge of research methodology and literature

Knowledge of human development and aging, ranging from pediatric to geriatric, as they relate to orthotic/prosthetic treatment

Knowledge of the psychology of the disabled

Knowledge of patient educational materials

Knowledge of federal and state rules, regulations, and guidelines (e.g., FDA, ADA, HIPPA)

Knowledge of ABC Facility Accreditation Standards

Knowledge of NCOPE Residency Standards

Skill in interpreting referral documents, (e.g., prescriptions, orders)

Skill in interpreting radiological images

Skill in communicating with patient/family/caregiver

Skill in communicating with referral sources and appropriately licensed health care providers

Skill in performing physical examinations

Skill in identifying gross surface anatomy

Skill in interpretation of physical findings (e.g., recognizing skin pressures, dermatological conditions)

Skill in analysis of normal and pathological gait/motion

Skill in analysis of orthotic/prosthetic gait/motion

Skill in managing patients relative to their diagnosis or condition

Skill in impression-taking/measuring for orthoses/prostheses

Skill in using mechanical measuring devices

Skill in using electrical measuring devices

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## Knowledge and Skill Statements

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- Skill in using computer-based measuring devices
  - Skill in patient delineation rectification and/or patient model modification
  - Skill in orthotic/prosthetic fabrication
  - Skill in use of safety equipment
  - Skill in use of hand and power tools
  - Skill in use of materials and components
  - Skill in use of alignment devices
  - Skill in aesthetic finishing
  - Skill in evaluating fit and function of an orthosis/prosthesis
  - Skill in adjusting and modifying orthoses/prostheses
  - Skill in maintaining and repairing orthoses/prostheses
  - Skill in restoring optimal fit and function of orthoses/prostheses
  - Skill in solving patient's problems related to ADLs
  - Skill in documentation
-

## Results and Discussion Related to Orthotic and Prosthetic 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.

Orthotic credentialed Certified Practitioners completed five time-allocation tasks and indicated for which of 31 orthotic devices associated with lower extremity, spinal, scoliosis, and upper extremity they performed the following tasks: perform initial assessment; measure/mold/digitize/scan; modify; fabricate; fit; and perform follow-up/evaluation.

Prosthetic credentialed Certified Practitioners completed two time-allocation tasks and two ranking tasks and indicated for which of 39 types of prosthetic devices they performed the following tasks: perform initial assessment; measure/mold; modify; fabricate; initial align/fit; delivery; and perform follow-up.

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 written, simulation, and clinical practical management examinations. The results also provide guidance to NCOPE in the development of orthotic and prosthetic residency and education standards.

Table 21 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 performing tasks in connection with lower extremity orthoses (55%). Of that time, they spend about one-half (26%) performing tasks in connection with AFOs, and somewhat less time performing tasks in connection with FOs (11%), and the least time performing tasks in connection with KAFOs, KOs, HOs, HKAFOs, and custom shoes. Certified Practitioners spend about 21% of their time performing tasks in connection with spinal orthoses, most typically TLSOs. Certified Practitioners spend generally equal amounts of time performing tasks in connection with either scoliosis-related orthoses or upper extremity orthoses (10% and 8%, respectively). 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.

**Table 21**  
**Certified Orthotists**  
**Percentage of Time in Practice Areas and with Regard to Orthoses**

<b>Practice Area</b>	<b>Area</b>	<b>Orthoses</b>
<b>1. Lower Extremity</b>	<b>55%</b>	
1.1 Custom shoes		3%
1.2 FO		11%
1.3 AFO		26%
1.4 KO		6%
1.5 KAFO		6%
1.6 HO		2%
1.7 HKAFO		1%
<b>2. Spinal</b>	<b>21%</b>	
2.1 LSO semi-rigid		5%
2.2 LSO rigid		4%
2.3 TLSO		7%
2.4 TLO		1%
2.5 CTO		1%
2.6 CO		2%
2.7 Halo		1%
<b>3. Scoliosis</b>	<b>10%</b>	
3.1 LSO		2%
3.2 TLSO		8%
3.3 CTLSO (Milwaukee)		0%
<b>4. Upper Extremity</b>	<b>8%</b>	
4.1 HO		1%
4.2 WHO		3%
4.3 WO		1%
4.4 EWHO		1%
4.5 EO		1–2%
4.6 SEWHO		0–1%
4.7 SO		0–1%
<b>5. Other</b>	<b>6%</b>	
5.1 Dynamic contracture orthoses		1%
5.2 Stance control orthoses		1%
5.3 FES (functional electrical stimulation)		0%
5.4 Burn garments		0%
5.5 Burn masks		0%
5.6 Protective face mask		1%
5.7 Cranial molding orthosis		3%

Certified Practitioners who spend a majority of their time providing orthotic-related services indicated they perform all six types of tasks in connection with lower extremity, spinal, scoliosis, and upper extremity orthosis (see Table 22). 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 Practitioners indicated they fabricate spinal orthoses, such as LSOs, TLSOs, or CTLSOs, and few indicated they perform any of the tasks with regard to upper extremity orthoses, such as WOs, EOs, SEWHO, or SOs.

**Table 22**  
**Certified Orthotists**  
**Orthotics Device List**  
**Percentage of Certified Practitioners Who Participated in Each Category**

<b>Orthotic Device</b>	<b>Perform Initial Assessment</b>	<b>Measure/ Mold/ Digitize Scan</b>	<b>Modify</b>	<b>Fabricate</b>	<b>Fit</b>	<b>Perform Follow-up/ Evaluation</b>
<b>Lower Extremity</b>						
Custom shoes	99%	97%	27%	7%	98%	100%
FO	100%	98%	77%	54%	98%	97%
AFO	100%	98%	82%	51%	99%	98%
KO	100%	99%	42%	22%	99%	98%
KAFO	99%	97%	72%	35%	96%	98%
HO	98%	98%	32%	17%	98%	99%
HKAFO	100%	99%	55%	30%	98%	100%
<b>Spinal</b>						
LSO semi-rigid	98%	99%	38%	17%	99%	98%
LSO rigid	98%	99%	44%	22%	98%	99%
TLSO	100%	97%	48%	25%	97%	99%
TLO	98%	97%	36%	21%	97%	100%
CTO	100%	94%	30%	17%	98%	98%
CO	98%	94%	25%	13%	98%	98%
Halo	92%	92%	27%	12%	88%	93%
<b>Scoliosis</b>						
LSO	99%	96%	44%	24%	98%	98%
TLSO	98%	95%	48%	24%	96%	98%
CTLSO (Milwaukee)	98%	93%	44%	23%	98%	98%
<b>Upper Extremity</b>						
HO	100%	96%	41%	22%	98%	94%
WHO	100%	97%	52%	33%	97%	94%
WO	100%	94%	33%	21%	99%	96%
EWHO	100%	96%	41%	25%	96%	96%
EO	100%	98%	36%	19%	99%	98%
SEWHO	98%	90%	27%	19%	100%	90%
SO	98%	95%	26%	15%	100%	94%



As documented in Table 23, orthotic credentialed Certified Practitioners indicated about one-third of their patients' spinal orthoses were custom made to patient model (34%), while 40% were custom fit to patient measurements, and 26% were custom fit (pre-manufactured devices).

**Table 23**  
**Percentage Allocations for Custom-Made vs. Custom-Fit Spinal Orthoses**

	%
Custom made to patient model	34%
Custom fit to patient measurements	40%
Custom fit (pre-manufactured devices)	26%

In terms of lower extremity patients, 88% of patients' AFO's were custom made to patient model, 4% were custom fit to patient measurements, and 8% were custom fit (pre-manufactured devices).

**Table 24**  
**Percentage Allocations for Custom-Made vs. Custom-Fit AFOs**

	%
Custom made to patient model	88%
Custom fit to patient measurements	4%
Custom fit (pre-manufactured devices)	8%

In terms of scoliosis patients, orthotic credentialed respondents indicated more than two-thirds of their patients were idiopathic patients (71%), while 19% were neuromuscular patients, and 10% were congenital patients.

**Table 25**  
**Percentage Allocations for Scoliosis Diagnosis Categories**

	%
Idiopathic	71%
Infantile (0 to 3 years)	2%
Juvenile (3 to 10 years)	11%
Adolescent (10 + years)	58%
Neuromuscular	19%
Congenital	10%

As documented in Table 26, prosthetic credentialed Certified Practitioners spend more than one-half of their time performing tasks associated with transtibial prostheses (54%), with most prostheses typically incorporating total surface-bearing or hydrostatic sockets and roll-on suction suspension systems. Certified Practitioners spend about one-fourth (27%) of their work time performing tasks associated with transfemoral prostheses, with most typically incorporating ischial containment sockets, fluid control schemes, and roll-on with locking mechanism or traditional suction with expulsion valve suspensions. Certified Practitioners spend no more than a total of 5%, 3% and 5% of their time, respectively, in connection with transradial, transhumeral, and Symes prostheses.

**Table 26**  
**Certified Prosthetists**  
**Percentage of Time in Practice Areas and with Regard to Prostheses, Sockets, Control Schemes, and Suspensions**

Practice Area	% of Practice			
	Prostheses	Sockets	Control Schemes	Suspensions
<b>1A Transtibial</b>	<b>54%</b>			
1B Patella tendon bearing		12%		
1B Total surface bearing (no locking mechanism employed)		20%		
1B Hydrostatic (employing locking mechanism)		22%		
1D Roll-on suction (with lock)				24%
1D Roll-on suction with other accessories				8%
1D Sleeve				11%
1D Vacuum-assisted				6%
1D Waist belt				1%
1D Supracondylar				4%
<b>2A Transfemoral</b>	<b>27%</b>			
2B Quadrilateral		2%		
2B Ischial containment		23%		
2B M.A.S. design		2%		
2C Fluid control			21%	
2C Microprocessor			6%	
2D Roll-on with locking mechanism				12%
2D Vacuum-assisted				3%
2D Traditional suction with expulsion valve				10%
2D Hip joint/pelvic band/waist belt				2%
<b>3A Transradial</b>	<b>5%</b>			
3C Myoelectric			2%	
3C Body-powered			3%	
3C Passive			0%	
3D Self				2%
3D Roll-on				1%
3D Vacuum-assisted				0%
3D Harness				2%
<b>4A Transhumeral</b>	<b>3%</b>			
4C Myoelectric			1%	
4C Body-powered			2%	
4C Hybrid (e.g., body-powered elbow and myoelectric hand)			0%	
4C Passive			0%	
4D Roll-on				1%
4D Harness				2%
4D Vacuum-assisted				0%
<b>5A Symes</b>	<b>5%</b>			
5B Patella tendon bearing		2%		
5B End bearing		3%		
5D Medial opening				1%
5D Posterior opening				1%
5D Expandable wall				1%
5D Silicone liner with expulsion valve				1%
5D Suspension pad				1%
<b>6 Other (partial foot and other disarticulations)</b>	<b>6%</b>			

As documented in Table 27, Certified Practitioners indicated they perform nearly all tasks in connection with the 14 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 Practitioners indicated they perform all seven types of tasks associated with transtibial and transfemoral prostheses, and few Certified Practitioners indicated they perform fabrication tasks associated with either elbow or shoulder disarticulation.

**Table 27**  
**Certified Prosthetists**  
**Prosthetics Device List**  
**Percentage of Certified Prosthetic Practitioners**  
**Who Participated in Each Prosthetic Activity**

	<b>Perform Initial Assessment</b>	<b>Measure/ Mold</b>	<b>Modify</b>	<b>Fabricate</b>	<b>Initial Fit/Align</b>	<b>Delivery</b>	<b>Perform Follow-up</b>
Partial foot	96%	94%	86%	49%	93%	93%	89%
Symes	99%	93%	95%	49%	93%	92%	90%
Transtibial	100%	98%	96%	50%	96%	98%	92%
Knee disarticulation	97%	95%	95%	48%	94%	94%	90%
Transfemoral	99%	98%	98%	48%	96%	98%	94%
Hip disarticulation	92%	90%	90%	38%	92%	90%	87%
Hemi-pelvectomy	89%	84%	84%	42%	84%	79%	79%
Partial hand	100%	100%	93%	40%	93%	100%	91%
Wrist disarticulation	98%	93%	88%	43%	90%	90%	95%
Transradial	97%	98%	98%	47%	95%	98%	95%
Elbow disarticulation	96%	96%	91%	26%	91%	96%	91%
Transhumeral	95%	93%	91%	43%	90%	91%	93%
Shoulder disarticulation	91%	91%	86%	23%	86%	86%	82%
Fore quarter	100%	90%	90%	30%	90%	90%	80%

As documented in Table 28, about one-fourth of all transtibial, transfemoral, and transhumeral prostheses implemented multiple suspension systems. Fewer transradial or symes prostheses implemented these systems.

**Table 28**  
**Percentage of Cases that Implemented Multiple Suspension Systems**

	%
Transtibial	26%
Transfemoral	27%
Transradial	14%
Transhumeral	25%
Symes	12%

About equal numbers of transtibial and transfemoral prostheses utilized axial rotation componentry (see Table 29).

**Table 29**  
**Percentage of Cases that Utilized Axial Rotation Componentry**

	%
Transtibial	28%
Transfemoral	32%

Finally, about equal numbers of transtibial and transfemoral prostheses utilized shock absorption componentry (see Table 30).

**Table 30**  
**Percentage of Cases that Utilized Shock Absorption Componentry**

	%
Transtibial	23%
Transfemoral	21%

## Highlights Related to Professional Background, Work Setting and Demographic Information

- Respondents were asked to describe the knowledge and/or skills they had acquired during the past year. Five % or more of the respondents indicated they had acquired each of the following knowledge and/or skills sets during the past year: CAD/CAM, computer skills, and familiarization with microprocessor knee mechanisms.
- About three-fourths of the Certified Practitioners in orthotics and prosthetics earned a bachelor's degree in O/P or a bachelor's degree and an O/P post-graduate certificate to initially qualify for practice.
- About 74% of the orthotic credentialed sample Certified Practitioners had 10 or more years of experience in orthotics, and 79% of the prosthetic credentialed sample of Certified Practitioners had 10 or more years of experience in prosthetics.
- In describing their primary work setting, 54% of the orthotic credentialed sample worked in a privately owned (37%) or publicly owned (17%) multi-facility orthotics and prosthetics service organization, 21% worked in a single-location facility (privately owned), and 17% worked in a hospital-based practice.  
  
In regard to the prosthetic credentialed sample, 53% worked in either a privately owned (34%) or publicly owned (19%) multi-facility orthotics and prosthetics service organization, and a smaller proportion worked in either a single-location facility (privately owned) (25%) or a hospital-based practice (13%).
- 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 orthotists and non-registered technicians.
- Respondents described the patients to whom they delivered direct patient care. Slightly more than one-third of the patients of the orthotic credentialed sample were either adult patients (36%) or geriatric patients (35%), while slightly less than one-third of the patients were pediatric patients (29%). In contrast, nearly one-half of the patients of the prosthetic credentialed sample were geriatric patients (49%), more than one-third were adult patients (39%), and few patients were pediatric patients (12%).
- One-half of the patients of the orthotic credentialed sample present with conditions that reflect disease-based etiologies (50%), and about one-fourth of the patients present with conditions that reflect trauma-based (26%) or congenital-based (24%) etiologies. In contrast, more than two-thirds of the patients of the prosthetic credentialed sample present with conditions that reflect disease-based etiologies (67%), and few present with conditions that reflect trauma-based (24%) or congenital-based (9%) etiologies.

- 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). More than 83% of all respondents indicated that CAD/CAM will become increasingly important.

Members of the orthotic credentialed sample indicated only about 16% of the devices they provide incorporate the use of CAD/CAM, whereas members of the prosthetic credentialed sample indicated that 24% of the devices they provide incorporate the use of CAD/CAM.

- Members of both the orthotic and prosthetic credentialed samples report about two-thirds of all orthotic devices they provide to their patients are fabricated on site and about one-third are outsourced. Prosthetic devices are somewhat less likely to be fabricated on site by members of the prosthetic credentialed sample.
- 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 ABC database.

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

- Certified Practitioners in both disciplines indicated they spend the most time performing tasks associated with Implementation of the Treatment Plan (25% and 29% for Certified Practitioners who spend a majority of their time in orthotics and prosthetics, respectively) and the least time performing tasks associated with Promotion of Competency and Enhancement of Professional Practice (about 8% regardless of discipline). They spend between 12% and 23% of their time performing tasks associated with each of the remaining four specifically delineated domains.
- The mean Criticality ratings for the four domains related to direct patient care indicate 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 these two domains are also moderately to highly critical (3.1 to 3.4). Accordingly, all six domains appropriately focus on activities critical to optimizing outcomes for patients, caregivers, and health care providers.
- With only four exceptions, the Frequency ratings for the tasks performed by Certified Practitioners in both orthotics and prosthetics are similar; they do not vary by more than 0.3 of a rating scale point. Regardless of discipline, the ratings indicate Certified Practitioners perform 43 of the 47 tasks associated with the four direct patient care domains frequently to routinely. They perform the remaining six tasks in those same domains occasionally to frequently.

- Certified Practitioners perform the tasks associated with one of the two remaining domains (Practice Management) frequently to routinely and the tasks associated with the remaining domain (Promotion of Competency and Enhancement of Professional Practice) somewhat less frequently. On the other hand, a review of those three tasks associated with lower frequency ratings indicates these tasks do not readily lend themselves to frequent performance (e.g., Conduct or participate in product development research, clinical trials, and outcome studies).
- With only one exception, the Criticality ratings for Certified Practitioners in both disciplines are very similar; that is, within 0.3 of a rating scale point. Certified Practitioners rated all tasks as moderately to very critical.
- In summary, the overall pattern of the Frequency and Criticality ratings on the tasks indicates 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 71 of 74 statements indicate these knowledge and these skills are moderately to highly critical in regard to optimizing outcomes for patients, caregivers, and health care providers. The ratings for the remaining three 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 64 of the 74 statements primarily before passing the ABC examinations. Using a similar criterion for the prosthetic credentialed sample of Certified Practitioners, knowledge and skills for 61 of the 74 statements were supported for acquisition primarily before passing the ABC examinations. Implementing a somewhat less stringent criterion for support (e.g., >33%) would lead to establishing support for the acquisition of the knowledge and skills for 69 statements each for the orthotics and prosthetics credentialed samples.
- The results of the Acquisition rating scale may also be used to identify knowledge and skills that are useful targets for either mandatory continuing education (MCE) or in-service education initiatives. To the degree that respondents support Acquisition primarily after passing the ABC examinations (rating scale point 2), a body of knowledge or a skill may be considered as validated for use in a program of MCE or in-service education. Twenty-three and 25 of the knowledge and skills statements are supported for acquisition primarily after passing the ABC examinations by more than one-third of the orthotic credentialed and prosthetic credentialed Certified Practitioners, respectively.

- Orthotic Certified Practitioners spend more than one-half of their time performing tasks in connection with lower extremity orthoses. Of that time, they spend about one-half (about 26%) performing tasks in connection with AFOs, and somewhat less time performing tasks in connection with FOs (11%), and the least time performing tasks in connection with KAFOs, KOs, HOs, HKAFOs, and custom shoes. Certified Practitioners spend about 21% of their time performing tasks in connection with spinal orthoses, most typically either TLSOs. Certified Practitioners spend generally equal amounts of time performing tasks in connection with either scoliosis-related orthoses or upper extremity orthoses (10% and 8%, respectively). 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 Practitioners who spend a majority of their time providing orthotic-related services indicated they perform all six types of tasks in connection with lower extremity, spinal, scoliosis, and upper extremity orthosis. 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 Practitioners indicated they fabricate spinal orthoses such as LSOs, TLSOs, or CTLSOs, and few indicated they perform any of the tasks with regard to upper extremity orthoses such as WOs, EOs, SEWHOs, or SOs.
- Prosthetic credentialed Certified Practitioners spend more than one-half of their time performing tasks associated with transtibial prostheses (54%), with most prostheses typically incorporating total surface-bearing or hydrostatic sockets and roll-on suction suspension systems. Certified Practitioners spend about one-fourth of their work time performing tasks associated with transfemoral prostheses, with most typically incorporating ischial containment sockets, fluid control schemes, and roll-on with locking mechanism or traditional suction with expulsion valve suspensions. Certified Practitioners spend no more than a total of 5%, 3%, and 5% of their time, respectively, in connection with transradial, transhumeral, and Symes prostheses.
- Certified Practitioners who spend the majority of their time practicing prosthetic-related services indicated they perform nearly all tasks in connection with the 14 specifically delineated types of prosthetic devices. 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 Practitioners indicated they perform all seven types of tasks associated with transtibial and transfemoral prostheses, and few Certified Practitioners indicated they perform fabrication tasks associated with either elbow or shoulder disarticulation.





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