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 (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 a year's planning, execution, data analysis, and writing.

ABC regularly conducts a practice analysis study to update the profile of the profession and to adjust certification exam material as necessary, as well as providing information to members of the profession, researchers, regulators, and primary and continuing education programs. Prior studies were published in 1991, 2000, 2007 and 2015.

Many dedicated professionals generously contributed their time and expertise. Over 1,000 individuals participated in different phases of the practice analysis study including the Practice Analysis Task Force members, survey pilot test participants, and survey respondents.

In particular, the Practice Analysis Task Force members contributed many hours of their time to define the tasks, knowledge and skills of the O&P practitioner, develop the survey, review the results, and finalize the resulting test specifications.

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Introduction to a Practice Analysis

The American Board for Certification in Orthotics, Prosthetics & Pedorthics (ABC) is an organization with a mission 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 describes the O&P practitioner role as follows:

> "An ABC Certified Orthotist and/or Prosthetist is a health care professional specifically educated and trained to manage comprehensive orthotic and/or prosthetic patient care. This includes patient assessment, formulation of a treatment plan, implementation of a treatment plan, follow-up and practice management. Documentation by the orthotist and/or prosthetist is part of the patient's medical record and assists with establishing medical necessity for orthotic and/or prosthetic care."

This report describes the practice analysis study, including the:

- rationale for conducting the practice analysis study
- types of data analyses conducted
- survey results and
- methods used to define job tasks, knowledge and skills

Practice Analysis Study and Adherence to Professional Standards

A practice analysis study refers to procedures designed to obtain descriptive information about the tasks performed on a job and the knowledge, skills, or abilities requisite to the performance of those tasks. The specific type of information collected during a practice analysis study is determined by the purpose for which the information will be used.

For purposes of developing credentialing examinations, a practice analysis study should identify important tasks, knowledge, skills, and/or abilities deemed important by the profession.

The use of a practice analysis study (also known as job analysis, role and function study, or role delineation) to define the content domain(s) is a critical component in establishing the content validity of the certification. Content validity refers to the extent to which the content covered by an examination is representative of the tasks, knowledge, skills, or abilities related to a job.

A well-designed practice analysis study should include the participation of a representative group of subject matter experts who reflect the diversity within the profession. Diversity refers to regional or job context factors and to factors such as experience, gender, and race/ethnicity. Demonstration of content validity is accomplished through the judgments of subject matter experts. The process is enhanced by the inclusion of large numbers of experts who represent the diversity of the relevant areas of expertise.

The *Standards for Educational and Psychological Testing*[1] (2014) (the *Standards)* is a comprehensive technical guide that provides criteria for the evaluation of tests, testing practices, score interpretations, and the use of tests to make decisions. It was developed jointly by the American Psychological Association (APA), the American Educational Research Association (AERA), and the National Council on Measurement in Education (NCME). The guidelines presented in the *Standards*, by professional consensus, have come to define the necessary components of quality testing. As a consequence, a testing program that adheres to the *Standards* is more likely to be judged to be valid and defensible than one that does not.

As stated in Standard 11.13,

> "The content domain to be covered by a credentialing test should be defined clearly and justified in terms of the importance of the content for credential-worthy performance in an occupation or profession. A rationale and evidence should be provided to support the claim that the knowledge or skills being assessed are required for credential-worthy performance in that occupation and are consistent with the purpose for which the credentialing program was instituted.... Typically, some form of job or practice analysis provides the primary basis for defining the content domain...." (pp 181-182)

This practice analysis study for the O&P practitioner was designed to follow the guidelines presented in the *Standards* and to adhere to accepted professional practice.

[1] American Educational Research Association, American Psychological Association, National Council on Measurement in Education (Eds.). (2014). *Standards for Educational and Psychological Testing*. Washington, DC: American Psychological Association.

Executive Summary

A practice analysis study is designed to obtain descriptive information about the tasks performed on a job and the knowledge and skills needed to adequately perform those tasks. The purpose of this practice analysis study was to:

- validate the tasks, knowledge, and skills important for the orthotist and/or prosthetist profession; and
- develop test specifications for the O&P practitioner exams.

Conduct of the Practice Analysis Study

The practice analysis study consisted of several activities: background research, collaboration with subject matter experts to ensure representativeness of the tasks, knowledge, skills, and practice areas; survey development; survey dissemination; compilation and analysis of survey results; and test specifications development. The successful outcome of the practice analysis study depended on the excellent information provided by ABC certified practitioners actively working as orthotists and/or prosthetists.

Survey Development

Survey research is an effective way to identify the tasks, knowledge, and skills that are important for orthotists and prosthetists. The task, knowledge, and skill statements included on the survey covered six domains of practice. The development of the survey was based on a draft of task and knowledge statements developed from a variety of resources, but primarily on the previous practice analysis conducted in 2015.

Survey Content

The survey consisted of six sections.

Section 1: Tasks

Section 2: Domains of Practice

Section 3: Knowledge and Skills

Section 4: Orthotic Practice Areas, Orthoses and Additional Questions

OR

Prosthetic Practice Areas, Devices and Additional Questions

Section 5: Work and Patient Characteristics

Section 6: Background and General Information

Survey Ratings

Participants were asked to rate each task statement by its importance for a newly certified orthotist's and/or prosthetist's job performance using a five-point scale (0 = Of no importance to 4 = Very important). Additionally, participants were asked how frequently they perform the task in their current role, on average, using a five-point scale (0 = Never/Not applicable to 4 = Very often). Participants were asked to rate each knowledge and skill statement by its importance for a newly certified orthotist's and/or prosthetist's job performance using a five-point scale (0 = Of no importance to 4 = Very important).

Content Coverage

Evidence was provided for the comprehensiveness of the content coverage within the domains. If the task statements within a domain are adequately defined, then it should be judged as being well covered. Respondents indicated that the content within each task domain was well to very well covered, thus supporting the comprehensiveness of the defined domains.

Study Summary

In summary, this study used a multi-method approach to identify the tasks, knowledge, skills, and practice areas that are important to the work performed by O&P practitioners. The practice analysis process allowed for input from a representative group of orthotists and prosthetists and was conducted within the guidelines of professionally sound practice. ABC will use the results of the practice analysis to guide development of ABC's examinations. The list of tasks, knowledge, and skills that resulted from the study are intended to inform students in O&P and candidates for the exams regarding what they can expect in the profession and what will be expected of them when they enter the profession. The study provides a snapshot of current practice and results can also be used in other areas of the profession as a reference tool, such as to inform training activities, research priorities or materials development. Practice analysis is a critical tool for any profession and should be repeated at regular intervals to ensure that exam content and practices remain current.

2022 Survey Findings Highlights

- Twenty-seven percent of the orthotic credentialed sample had one to five years of experience and 52% had 11 or more years of experience. Eighteen percent of the prosthetic credentialed sample had one to five years of experience and 62% had 11 or more years of experience. (See Table 2)

- Forty-eight percent 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 and 32% of the Certified Practitioners in orthotics and prosthetics earned a master's degree in O/P to initially qualify for practice. (See Table 3)

- The largest percentage of patients of the orthotic credentialed sample present with conditions that reflect the chronic phase of care (42%) and the next most frequent phase was the rehabilitative phase of care (33%). In the prosthetic credentialed sample, the largest percentage of patients is in the rehabilitative phase of care (50%) and the second most are the chronic phase of care (37%). Both disciplines see the least number of patients in the acute phase of care (25% for orthotics, 18% for prosthetics). (See Table 16)

- Regarding the etiology of the conditions, nearly two thirds of prosthetic patients (63%) present with disease, while less than half of orthotic patients (37%) do so. About one quarter of patients in each discipline present with trauma. A large difference was found regarding congenital etiologies; 42% of orthotic patients, but only 12% of prosthetic patients are in this category. (See Table 17)

- Less than half of all orthotic devices provided to patients are fabricated onsite (39%) with the remainder outsourced. Prosthetic devices are somewhat more likely to be fabricated onsite (61%). (See Table 19)

- Certified Orthotists indicated that they spend the most time performing tasks associated with Patient Evaluation (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 Professional Practice (about 7.5% regardless of discipline). (See Table 21)

- Certified Orthotists spend more than one half of their time (54%) performing tasks in connection with lower extremity orthoses. Of that time, they spend about 19% performing tasks in connection with AFOs, and somewhat less time performing tasks in connection with FOs (7%) and SMOs (6%). Certified Orthotists spend about 14% of their time performing tasks in connection with spinal orthoses, most typically with TLSOs / LSOs, semirigid (5%). Certified Orthotists spend 10% of their performing tasks in connection with scoliosis-related orthoses and 8% with upper extremity orthoses. 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 13% of their time with cranial orthoses. (See Table 25)

- Certified Prosthetists spend more than half of their time performing tasks associated with transtibial prostheses (51%), with most prostheses typically incorporating a hybrid socket design and roll-on liner type suspension system. Certified Prosthetists spend more than one-fourth of their work time performing tasks associated with transfemoral and knee disarticulation prostheses (26%), with most typically incorporating ischial containment sockets and roll-on liner with locking mechanism type suspension. Certified Prosthetists spend no more than a total of 4%, 2% and 4% of their time, respectively, in connection with transradial, transhumeral and Symes prostheses. (See Table 35)

Survey Results

Survey Responses

Of the 5,504 certified practitioners invited to participate, 1,645 O&P practitioner professionals (29.9%) submitted a complete or partial response. To be included in the final analysis, Prometric's data analysis protocol requires that responses be at least 55% complete (excluding background information questions). A total of 975 survey responses qualified to be used for the final analyses, resulting in a useable response rate of 17.7%.

Based on the analysis of survey responses, a representative group of O&P practitioner professionals completed the survey in sufficient numbers to meet the requirements to conduct statistical analysis. This was evidenced by the distribution of responses for each of the background information questions and was confirmed through discussion with the task force.

SECTION ONE

Results Related to Professional Background, Demographic Information and Work Setting

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.

Professional Background

The profile of survey respondents is below. The results in the tables below reflect the sample size of 975 used for the analyses: 540 orthotics-track responses and 435 prosthetics-track responses. In each table, orthotics-track and prosthetics-track respondent results are presented separately as well as aggregated.

As seen in Table 1, overall, a majority of respondents (61%) hold the CPO credential, while the remaining respondents (39%) hold single-discipline credentials.

Table 1

ABC Practitioner Credential Held

	Orthotics	Prosthetics
CO	42%	0%
CP	0%	35%
CPO	58%	65%
Total	100%	100%

Both orthotics-track respondents and prosthetics-track respondents were asked how many years of experience they have in orthotic and prosthetic practice (Table 2). Respondents overall reported a wide variety of years of experience in the disciplines. The largest share of orthotics-track respondents reported having 1–5 years of experience in orthotics (27%), followed by 11–20 (22%). Only 16% of the orthotic respondents in the 2015 study were in the 1-5 years of experience group. The largest share of prosthetics-track respondents, on the other hand, reported having 21–30 years of experience in prosthetics (23%), followed by 11–20 (20%).

Table 2

Years of Experience in Orthotic and Prosthetic Practice

	Orthotics	Prosthetics
0	0%	0%
1–5	27%	18%
6–10	14%	15%
11–20	21%	20%
21–30	15%	23%
31 or more	15%	19%
Did not answer	*8%*	*5%*
Total	100%	100%

There was a significant increase in the percentage of orthotists and prosthetists who reported obtaining a master's degree to initially qualify for their credential. Thirty-six percent of orthotists and 26% of prosthetists reported having a master's degree in O/P (Table 3) compared to 6% and 4% in the 2015 study.

Table 3

Degree/Certificate/Diploma that Initially Qualified for Credential

	Orthotics	Prosthetics
HS/GED	1%	1%
HS/GED and O/P short-term courses	2%	1%
HS/GED and O/P certificate	2%	2%
AA/AS	2%	3%
AA/AS in O/P	2%	3%
BS in O/P	10%	14%
BA/BS and O/P certificate	33%	40%
Master's degree in O/P	36%	26%
Other (please specify)	4%	6%
Did not answer	*8%*	*6%*
Total	100%	100%

Respondents were also asked to report the highest education they have completed in any discipline. Table 4 shows that the largest share have earned a master's degree in O&P (31%).

Table 4

Highest Educational Degree/Certificate/Diploma Earned in any Discipline

	Orthotics	Prosthetics
HS/GED	0%	0%
HS/GED and O/P short-term courses	1%	1%
HS/GED and O/P certificate	2%	2%
AA/AS in O/P	2%	2%
AA/AS (non-O/P)	2%	2%
BS in O/P	9%	12%
BA/BS (non-O/P)	5%	8%
BA/BS and O/P certificate	26%	28%
Master's degree in O/P	36%	26%
Master's degree (non-O/P)	7%	10%
Doctorate	2%	2%
Other (please specify)	1%	3%
Did not answer	*8%*	*6%*
Total	100%	100%

As can be seen in Table 5, a majority of respondents (82% overall) work on a full-time basis in the O&P profession.

Table 5

Employment Status in the O&P Profession

	Orthotics	Prosthetics
Full-time	82%	82%
Part-time	7%	8%
Not currently working in the O&P profession	3%	4%
Did not answer	*8%*	*6%*
Total	100%	100%

Demographic Information

Respondents were asked to share personal demographic data, including age, racial/ethnic background, gender identity and sexual orientation. The results of which are presented below in Tables 6-9. The most significant change from the 2015 report was in the orthotics discipline. In 2015 only 20% of the respondents reported their age in the 25-34 category, which was the fourth largest group. This increased to 34% and became the largest group of respondents.

Table 6

Age

	Orthotics	Prosthetics
Under 25	0%	0%
25-34	34%	22%
35-44	20%	21%
45-54	16%	22%
55-64	17%	21%
65+	5%	8%
Did not answer	*8%*	*7%*
Total	100%	100%

The question about race and ethnicity allowed participants to select more than one option. Table 7 includes respondents who selected more than one racial/ethnic background, so the total responses indicated are higher than the total number of respondents.

Table 7

Racial/Ethnic Background

	Orthotics	Prosthetics
American Indian or Alaska Native	1%	1%
Asian	6%	3%
Black or African American	2%	1%
Hispanic or Latinx	3%	3%
Native Hawaiian or Other Pacific Islander	1%	0%
White (Non-Hispanic)	77%	79%
Other (please specify)	0%	2%
Prefer not to answer	5%	6%
Did not answer	*9%*	*7%*
Total	102%	101%

Gender profiles of respondents changed significantly from the 2015 study. Women made up nearly 50% of orthotic respondents (versus 28%). Men were 79% of prosthetic respondents in 2015 and are now 62%.

Table 8

Gender Identity

	Orthotics	Prosthetics
Man	39%	62%
Woman	48%	25%
Non-binary	0%	0%
Transgender	0%	0%
An identity not listed (please specify)	0%	1%
Did not answer	*13%*	*12%*
Total	100%	100%

Table 9

Sexual Orientation

	Orthotics	Prosthetics
Asexual	5%	6%
Bisexual	3%	1%
Gay	1%	0%
Heterosexual/Straight	69%	73%
Lesbian	2%	1%
Pansexual	0%	0%
Queer	1%	0%
An orientation not listed (please specify)	1%	2%
Did not answer	*18%*	*16%*
Total	100%	100%

Work and Patient Characteristics

A profile of respondents' work and patient characteristics is presented below. Results were analyzed separately for orthotics-track and prosthetics-track respondents and are presented in parallel in Tables 10-19.

Respondents were asked to report which of the following best matched their primary work (employment) setting. The largest share reported working in a privately owned multi-facility orthotics and/or prosthetics practice (37.7%). The remaining respondents reported working in a variety of other settings, as can be seen in Table 10. There was a 5% decrease in the number of respondents who reported working in a single-location practice (privately owned) from the 2015 study.

Table 10

Primary Work Setting

	Orthotics	Orthotics
Part of a multi-facility orthotics and/or prosthetics practice (publicly owned)	16%	18%
Part of a multi-facility orthotics and/or prosthetics practice (privately owned)	38%	38%
Single-location orthotics and/or prosthetics practice (privately owned)	12%	16%
Hospital or rehabilitation center	15%	9%
University-based clinic or facility	3%	2%
Academic or educational institution (teaching/ research)	3%	3%
Central fabrication facility	1%	0%
O&P manufacturer/distributor	1%	3%
Other (please specify)	5%	6%
Did not answer	*7%*	*6%*
Total	100%	100%

Respondents were asked to identify the personnel at their primary work setting who perform seven activities: perform initial assessment; measure, mold, and/or scan; modify model or image; fabricate; fit and/or deliver; follow-up assessment and/or education; and modify and/or repair. Results are presented in Table 11 for orthotics-track responses and in Table 12 for prosthetics-track responses. The biggest change from the 2015 study was in the Fabricate area. In orthotics the percentage reduced from 55% to 41%, while in prosthetics it reduced from 60% to 45%. This shift is corroborated by the continued shift towards utilizing central fabrication versus in-house fabrication (see Table 14).

Table 11

Personnel at Work Site Who Perform Each Type of Activity (Orthotics)

	Perform initial assessment	Measure/ mold/ scan	Modify model/ image	Fabricate	Fit/ deliver	Follow-up assessment / education	Modify/ repair
Practitioners (including residents)	87%	86%	69%	41%	87%	86%	84%
Pedorthists	17%	16%	12%	8%	16%	16%	16%
Assistants	7%	10%	7%	7%	11%	12%	15%
Fitters	19%	13%	5%	4%	23%	20%	15%
Technicians	1%	2%	24%	49%	2%	1%	30%
Support personnel (non-credentialed)	2%	2%	2%	2%	2%	2%	3%

Table 12

Personnel at Work Site Who Perform Each Type of Activity (Prosthetics)

	Perform initial assessment	Measure/ mold/ scan	Modify model/ image	Fabricate	Fit/ deliver	Follow-up assessment / education	Modify/ repair
Practitioners (including residents)	88%	86%	85%	45%	87%	88%	87%
Pedorthists	21%	21%	14%	9%	21%	21%	20%
Assistants	6%	9%	7%	10%	10%	12%	15%
Fitters	18%	14%	4%	4%	23%	19%	15%
Technicians	1%	1%	16%	55%	1%	1%	35%
Support personnel (non-credentialed)	2%	1%	2%	5%	1%	3%	4%

The increases in the first two categories in Table 13 are likely due to the inclusion of adjustment and documentation to these descriptions in this study.

Table 13

Primary Work Performed

	Orthotics	Prosthetics
Clinical prosthetic patient care, including adjustment and documentation	12%	39%
Clinical orthotic patient care (custom-fabricated), including adjustment and documentation	40%	12%
Clinical orthotic patient care (prefabricated), including adjustment and documentation	16%	8%
Prosthetic fabrication	4%	10%
Orthotic fabrication	8%	3%
Education	7%	9%
Research	2%	3%
Administration	10%	13%
Other (please specify)	2%	3%
Total	100%	100%

Both disciplines reported seeing a higher percentage of patients in their own offices in comparison to other settings, versus the 2015 study. In orthotics the change was from 54% to 66%. In prosthetics it went from 63% to 71%.

Table 14

Percentage of Direct Patient Care Time Spent in Each Setting

	Orthotics	Prosthetics
O&P office	66%	71%
Specialty clinic (e.g., neuromuscular, cerebral palsy, spina bifida)	8%	3%
Acute care hospital	11%	8%
Long-term-care facility (e.g., nursing home, assisted living facility)	3%	6%
Standalone rehabilitation facility	6%	4%
Patient's residence	3%	6%
Any other facility	4%	2%
Total	100%	100%

The orthotic respondents reported that nearly half of the patients they see are pediatric. This is a marked increase from the 2015 study (37%). The prosthetic respondents reported similar percentages to the 2015 study.

Table 15

Percentage of Patients in Each Age Range

	Orthotics	Prosthetics
Pediatric (0 to 18)	48%	13%
Adult (19 to 65 years)	29%	50%
Geriatric (more than 65 years)	24%	37%
Total	100%	100%

There were only minor differences between the 2015 study and this report. There was a 6% reduction in the percentage of patients seen in the rehabilitative phase of care and a commensurate increase in chronic patients for orthotics. There were smaller but similar changes for prosthetics.

Table 16

Percentage of Patients in Each Phase of Care

	Orthotics	Prosthetics
Acute	25%	18%
Rehabilitative	33%	45%
Chronic	42%	37%
Total	100%	100%

The orthotic respondents reported that 42% of the patients they see are in the Congenital/Developmental etiological category. This is an increase from the 30% reported in the 2015 study. This change may be related to this study's expansion of Congenital to also include Developmental etiologies.

Table 17

Percentage of Patients in Each Etiological Category

	Orthotics	Prosthetics
Disease	37%	63%
Trauma	21%	25%
Congenital/Developmental	42%	12%
Total	100%	100%

For the first time, in this study respondents were asked about the percentage of orthoses/prostheses they provide that incorporated additive manufacturing. The results are shown in Table 18.

Table 18

Percentage of Orthoses/Prostheses in Each Area Incorporating Additive Manufacturing (3D printing)

	Orthotics	Prosthetics
Upper extremity orthoses	2%	2%
Lower extremity orthoses	6%	5%
Foot orthoses (including diabetic inserts)	11%	9%
Spinal orthoses	6%	3%
Cranial orthoses	10%	4%
Upper extremity prostheses	1%	5%
Lower extremity prostheses	3%	19%

For both orthotics and prosthetics there was an increase in the utilization of central fabrication from the 2015 study. In orthotics on-site fabrication reduced from 57% to 39%. In prosthetics it decreased from 69% to 61%.

Table 19

Percentage of Orthoses/Prostheses Fabricated Onsite Versus at Central Fabrication

	Orthotics	Prosthetics
Onsite	39%	61%
Central fabrication	61%	39%
Total	100%	100%

SECTION TWO

Results Related to Domains, Tasks, Knowledge and Skill Statements

This section provides a summary of survey respondents' ratings of the tasks, knowledge, and skills.

- **Domains** are global areas of responsibility performed by credentialed professionals; in the current delineation, the domains were identified as Patient Evaluation, Formulation of the Treatment Plan, Implementation of the Treatment Plan, Continuation of the Treatment Plan, Practice Management, and Promotion of Professional Practice.

- **Tasks** are the activities performed within a domain of practice.

- **Knowledge and skills 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 20. The Task Force identified the need for revisions to the domain names to provide more accurate and concise descriptions of O&P practice. Three changes to the domain names were discussed and ultimately approved. Patient Assessment was changed to Patient Evaluation. Follow-up to the Treatment Plan was changed to Continuation of the Treatment Plan and Promotion of the Competency and Enhancement of Professional Practice was changed to Promotion of Professional Practice.

Table 20

Domains and Tasks

Domains	No. of Task Statements
Domain 1. Patient Evaluation	8
Domain 2. Formulation of the Treatment Plan	10
Domain 3. Implementation of the Treatment Plan	17
Domain 4. Continuation of the Treatment Plan	14
Domain 5. Practice Management	8
Domain 6. Promotion of Professional Practice	6
Total	63

Domains

This section presents the results of the ratings related to the five domains delineated in the survey. The survey did not include the Promotion of Professional Practice survey in the percentage of time spent in each practice domain question (Table 21) because it is not included on any exams.

Table 21

Percentage of Time Spent in Practice Domains

	Orthotics	Prosthetics
Domain 1: Patient Evaluation - Perform a comprehensive clinical evaluation of the patient, including a history, physical examination, and an assessment of their functional baseline, to understand the patient's orthotic/prosthetic needs, goals, and expectations	28%	24%
Domain 2: Formulation of the Treatment Plan - Analyze and integrate information from the patient evaluation to create a comprehensive orthotic/prosthetic treatment plan to meet the patient's needs, goals, and expectations	18%	17%
Domain 3: Implementation of the Treatment Plan - Perform or direct all procedures necessary, including fabrication, to provide comprehensive orthotic/prosthetic treatment	23%	25%
Domain 4: Continuation of the Treatment Plan - Provide periodic follow-up care to assess the patient's ongoing needs, goals, and expectations	16%	19%
Domain 5: Practice Management - Adhere to policies and procedures regarding human resources, physical environment, business and financial practices, regulatory requirements, and organizational management	14%	16%
Total	100%	100%

Tasks

This section documents the quantitative ratings of the respondents on the task statements delineated in association with each of the five domains as well as the qualitative comments regarding the comprehensiveness of the delineation. All survey respondents rated the tasks on two rating scales:

Table 22

Task Rating Scales

FREQUENCY On average, how frequently do **YOU** perform the task in YOUR current position?	**IMPORTANCE** How important is this task for a **NEWLY CERTIFIED** orthotist's and/or prosthetist's job performance?
0 = Never/not applicable	0 = Of no importance
1 = Quarterly or less	1 = Of little importance
2 = Monthly	2 = Of moderate importance
3 = Weekly	3 = Important
4 = Daily	4 = Very important

A summary of task importance and frequency means is provided in Table 23. It should be noted that frequency is not necessarily related to importance: A task may be done infrequently but considered highly important, or it may be done frequently but considered less important.

Table 23

Frequency and Importance Ratings of Tasks

	Frequency		Importance	
	O	P	O	P
Domain 1 -- Patient Evaluation				
1. Review patient's prescription/referral	3.8	3.6	3.9	3.8
2. Take a comprehensive patient history, including demographic characteristics, psychosocial dynamics, previous use of an orthosis/prosthesis, diagnosis, work history, avocational activities, signs and symptoms, medical history, patient compliance with ancillary care, results of diagnostic evaluations	3.7	3.5	3.8	3.9
3. Ascertain patient and/or caregiver goals and expectations	3.7	3.5	3.8	3.8
4. Perform a diagnosis-specific clinical, functional, and cognitive examination (e.g., manual muscle testing, gait analysis, anatomy, range of motion, joint stability, skin integrity, sensory function)	3.6	3.4	3.7	3.7
5. Administer outcome measures to determine a baseline (e.g., pain scales, timed walking tests, functional mobility tests, validated questionnaires)	2.4	2.7	2.9	3.2
6. Consult with other healthcare providers and caregivers, as appropriate, about patient's condition to formulate a treatment plan as a part of the comprehensive plan of care	3.1	3.0	3.4	3.4
7. Document the findings of the patient evaluation according to established record-keeping requirements	3.8	3.6	3.9	3.8
8. Refer patient, if appropriate, to other healthcare providers for intervention beyond orthotic/prosthetic scope of practice	2.5	2.6	3.1	3.3

	Frequency		Importance	
	O	P	O	P
Domain 2 -- Formulation of the Treatment Plan				
1. Analyze the findings of the patient evaluation	3.7	3.5	3.8	3.8
2. Formulate treatment goals based on expected orthotic/prosthetic outcomes (e.g., reduce pain, provide stability, prevent deformity, and/or promote healing to enhance function and independence)	3.7	3.5	3.8	3.8
3. Communicate with the referral source to modify, if necessary, the original prescription and/or treatment plan	2.8	2.7	3.4	3.4
4. Investigate treatment options by obtaining evidence from the literature to formulate the treatment plan	2.1	2.1	2.9	2.9
5. Develop a treatment plan which includes patient education and follow-up based on patient evaluation, medical necessity, treatment goals, needed frequency of treatment, and patient's goals and expectations	3.6	3.4	3.7	3.7
6. Identify design, materials, and components needed to implement the treatment plan	3.7	3.5	3.7	3.7
7. Discuss with the patient and/or caregiver about the recommended treatment plan(s), including disclosure of potential risks, benefits, and limitations in orthotic or prosthetic care	3.7	3.5	3.8	3.8
8. Document treatment plan specifying medical necessity according to established record-keeping requirements	3.7	3.5	3.8	3.8
9. Ensure that the patient or responsible parties are informed of their financial responsibilities (e.g., insurance eligibility, verification of benefits, prior authorization, deductibles) as they pertain to recommended treatment plan(s)	3.0	2.9	3.2	3.3
10. Communicate recommended treatment plan to the patient's health care team	2.9	2.8	3.1	3.2

	Frequency		Importance	
	O	P	O	P
Domain 3 -- Implementation of the Treatment Plan				
1. Provide patient with care to prepare them for orthotic/prosthetic treatment (e.g., diagnostic device, compression garment, shrinker)	3.0	3.3	3.5	3.7
2. Inform patient and/or caregiver(s) of the measurement/shape capture technique, including the possible risks and time involved	3.5	3.2	3.4	3.3
3. Select and perform measurement/shape capture technique (e.g., identify anatomical landmarks, measure, take impression, trace limb, digital scan)	3.7	3.4	3.9	3.9
4.Refer to manufacturer specifications and other technical resources regarding components/materials	2.9	2.9	3.4	3.4
5. Select appropriate materials and components for orthosis/prosthesis based on patient criteria to ensure optimum strength, durability, and function (e.g., orthotic joints, prosthetic components, and lamination or thermoforming techniques)	3.6	3.4	3.8	3.8
6. Create and/or modify positive or digital model for fabrication (e.g., fill cast, carve positive model, reverse tracing)	2.8	3.3	3.4	3.8
7. Fabricate and/or assemble orthosis/ prosthesis prior to initial or diagnostic fitting	2.7	3.0	3.3	3.5
8.ĂAssess the item for structural safety andĂ ensure that manufacturer guidelines haveĂ been followed prior to fitting and deliveringĂ the device to the patient (e.g., torqueĂ values, patient weight limits)	3.5	3.4	3.8	3.8
9. Perform initial fitting, assessment, and alignment of orthosis/prosthesis in sagittal, transverse, and coronal planes to achieve maximum function and ensure patient safety	3.7	3.5	3.9	3.9
10. Finalize orthosis/prosthesis fabrication after achieving optimal fit and function (e.g., convert diagnostic device/socket to definitive orthosis/prosthesis)	3.1	3.0	3.6	3.6
11. Ensure that materials, design, and components are provided as specified in the treatment plan	3.6	3.4	3.7	3.7
12. Administer Outcome Measure(s) at delivery and compare to baseline value(s)	2.3	2.5	3.0	3.1

	Frequency		Importance	
	O	P	O	P
Domain 3 -- Implementation of the Treatment Plan				
13. Educate patient and/or caregiver(s) about the use and maintenance of the orthosis/prosthesis (e.g., wear schedules, care instructions)	3.8	3.5	3.9	3.9
14. Ensure the patient's ability to wear and use the orthosis/prosthesis	3.8	3.5	3.9	3.9
15. Refer patient to appropriate healthcare providers for necessary ancillary care	2.7	2.9	3.2	3.4
16. Verify progress towards goals outlined in the treatment plan	3.0	2.9	3.3	3.4
17.Document treatment and outcomes according to established record keeping requirements	3.6	3.4	3.7	3.7

	Frequency		Importance	
	O	P	O	P
Domain 4 -- Continuation of the Treatment Plan				
1. Obtain feedback from patient and/or caregiver (e.g., adherence to wear schedule, comfort, perceived benefits and detriments, ability to don and doff, proper usage and function, overall patient satisfaction)	3.4	3.4	3.7	3.7
2. Assess patient's current function and any changes in the patient's condition (e.g., skin condition, volume, general health, height, weight)	3.5	3.3	3.7	3.8
3. Review the patient's psychosocial status (e.g., family status, job, or caregiver)	2.8	2.8	3.0	3.1
4. Evaluate the fit of orthosis/prosthesis relative to anatomical accuracy (e.g., multiple force systems, total contact)	3.7	3.4	3.9	3.8
5. Evaluate the alignment and function of orthosis/prosthesis relative to treatment goals (e.g., segmental relationships, dynamic alignment)	3.6	3.4	3.8	3.8
6. Inspect the structural integrity of the orthosis/prosthesis	3.6	3.3	3.8	3.8
7. Evaluate the patient's progress toward treatment goals	3.2	3.0	3.5	3.5
8. Formulate and inform the patient and/or caregiver of the plan to modify orthosis/prosthesis based on patient feedback and observations	3.4	3.1	3.7	3.6
9. Modify orthosis/prosthesis (e.g., relieve pressure, change range of motion, adjust alignment, exchange components) and reassess device for structural safety	3.6	3.4	3.8	3.8
10. Evaluate the results of modifications and ability of the patient to wear and use the orthosis/prosthesis	3.6	3.3	3.8	3.8
11. Administer Outcome Measure(s) and compare to baseline value(s)	2.2	2.4	2.9	3.0
12. Develop follow-up plan and communicate with patient and/or caregiver(s)	3.4	3.2	3.5	3.6
13. Document findings, actions, and follow-up plan according to established record keeping requirements	3.7	3.4	3.7	3.7
14. Communicate changes in patient's condition or treatment plan to their health care team	2.8	2.7	3.3	3.3

	Frequency		Importance	
	O	P	O	P
Domain 5 -- Practice Management				
1. Adhere to organizational policies and procedures in compliance with all applicable federal and state laws and regulations (e.g., CMS, False Claims Act, Stark Law, Anti-Kickback Statute, HIPAA, FDA, OSHA, O&P licensure)	3.8	3.7	3.7	3.6
2. Comply with ABC ethical and facility guidelines (e.g., Code of Professional Responsibility, Facility Accreditation Standards)	3.8	3.8	3.7	3.7
3. Comply with professional guidelines including management and supervision of care extenders (i.e., ABC Scope of Practice)	3.7	3.7	3.6	3.6
4. Develop and implement personnel policies and procedures (e.g., employee orientation, diversity and inclusion, sexual harassment, benefits, training, incentives, recognition, regular performance evaluations)	3.0	3.1	2.4	2.5
5. Adhere to policies and procedures for patient care that comply with current medical, legal, and third-party reimbursement requirements	3.7	3.8	3.7	3.5
6. Document patient clinical notes and financial records according to established record keeping requirements	3.8	3.8	3.7	3.6
7. Create a professional and collaborative working environment to improve patient care	3.7	3.7	3.6	3.5
8. Use data to analyze current practices and identify opportunities for performance and quality improvement	3.0	3.1	2.3	2.5

	Frequency		Importance	
	O	P	O	P
Domain 6 -- Promotion of Professional Practice				
1. Participate in or provide continuing education for orthotists, prosthetists and other healthcare providers through activities such as seminars, case studies, and authoring publications	3.1	3.1	1.8	1.8
2. Participate in education and mentoring of residents, students and care extenders	2.7	2.7	2.2	2.4
3. Conduct or participate in research, clinical trials, outcome studies, and product development	2.3	2.3	1.2	1.4
4. 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)	2.2	2.3	0.8	1.1
5. Volunteer to support the profession (e.g., professional organizations, committees, licensure boards, community-based programs, international outreach)	2.5	2.4	1.1	1.3
6. Promote the awareness, competency, and enhancement of the orthotic/prosthetic profession	2.9	2.9	1.9	1.9

Knowledge and Skill Statements

Knowledge and skills 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.

The complete list of knowledge and skill importance means is provided in Table 24. The task force made multiple edits to the knowledge and skill statements for clarity and to describe more fully what the knowledge or skill was describing. Two new skill statements were also added. Performing a physical exam (e.g., ROM, MMT) and performing orthotic/prosthetic gait training are the new additions. These two skills were previously included with other statements, however the task force agreed they should be listed as separate and distinct skills.

Table 24

Knowledge and Skill Statements

Knowledge of —
1. Musculoskeletal anatomy, including upper limb, lower limb, spinal, cranial
2. Neuroanatomy and neurophysiology
3. Systems anatomy (e.g., motor control, vestibular, somatosensory)
4. Surface anatomy (e.g., bony landmarks)
5. Medical terminology
6. Kinesiology, including upper limb, lower limb, spinal
7. Normal human locomotion
8. Observational gait assessment
9. Pathological gait
10. Gait training
11. Tissue characteristics and management
12. Wound care
13. Volumetric control
14. Planes of motion
15. Biomechanics
16. Mechanics (e.g., levers, force systems)
17. Pathologies (e.g., muscular, neurologic, skeletal, vascular)
18. Basic pharmacology
19. Referral documents (e.g., diagnostic codes)
20. Procedures for data collection and recording
21. Policies and procedures regarding protected health information (PHI)
22. Roles and responsibilities associated with other healthcare professions

Knowledge of —
23. Reimbursement protocols (e.g., CMS LCDs)
24. Material safety procedures and standards (e.g., OSHA, SDS)
25. Standard/universal precautions
26. Orthotic/prosthetic design
27. Orthotic/prosthetic fitting criteria
28. Clinical examination techniques (e.g., range of motion, manual muscle tests, sensation, proprioception)
29. Measurement and shape capture techniques, materials, devices, and equipment
30. Measurement tools and techniques
31. Modification/rectification procedures as they relate to specific orthotic/prosthetic designs
32. Orthotic/prosthetic forms (e.g., assessment, orthometry, measurement, evaluation, outcomes)
33. Outcome measures
34. Materials science
35. Components
36. Alignment devices and techniques
37. Hand and power tools
38. Care and maintenance of orthoses/prostheses
39. Digital shape capture, computer-aided design, and additive manufacturing (e.g., 3D printing)
40. Item warranty and warranty limitations
41. Risk management (e.g., liability, financial audits, patient confidentiality, facility safety)
42. Research methodology and literature
43. Biostatistics
44. Human development and aging as they relate to orthotic and prosthetic treatment
45. Psychology of patients with disability (e.g., social determinants of health)
46. Disability rights (e.g., ADA)
47. Patient educational materials
48. Ethical standards, including ABC Code of Professional Responsibility
49. Scope of practice related to orthotic/prosthetic credentials
50. Boundaries of the scope of practice (i.e., when to refer a patient to other healthcare providers/caregivers)
51. Federal and state rules, regulations, and guidelines (e.g., FDA, HIPAA)
52. ABC Facility Accreditation Standards
53. NCOPE Residency Standards

Skill in —
54. Interpreting referral documents (e.g., prescriptions, orders)
55. Interpreting radiological images
56. Communicating with patient and/or caregiver(s)
57. Communicating with referral sources and appropriately licensed healthcare providers
58. Conducting a comprehensive clinical evaluation (e.g., history, goals, expectations)
59. Identifying surface anatomy
60. Performing a physical exam (e.g., ROM, MMT)
61. Interpreting physical findings (e.g., recognizing skin pressures, dermatological conditions)
62. Assessing pathological gait or motion
63. Assessing orthotic/prosthetic gait or motion
64. Performing orthotic/prosthetic gait training
65. Managing patients relative to their diagnosis or condition
66. Critically assessing the literature as it pertains to patient care
67. Measuring and capturing shapes of patients for orthoses/prostheses
68. Using mechanical measuring devices
69. Using computer-based measuring devices/scanning devices
70. Delineating, rectifying, and/or modifying positive or digital models
71. Fabricating orthotic/prosthetic devices
72. Using safety equipment
73. Using hand and power tools
74. Selecting appropriate materials and components
75. Using alignment devices
76. Aesthetic finishing
77. Evaluating fit and function of an orthosis/prosthesis
78. Selecting, administering, and interpreting outcome measures
79. Adjusting and modifying orthoses/prostheses
80. Maintaining and repairing orthoses/prostheses
81. Addressing patient's goals related to activities of daily living
82. Revising treatment plans to reflect patient's change in condition
83. Documenting clinical care and medical justification

SECTION THREE

Results Related to Practice Areas, Orthoses and Prostheses

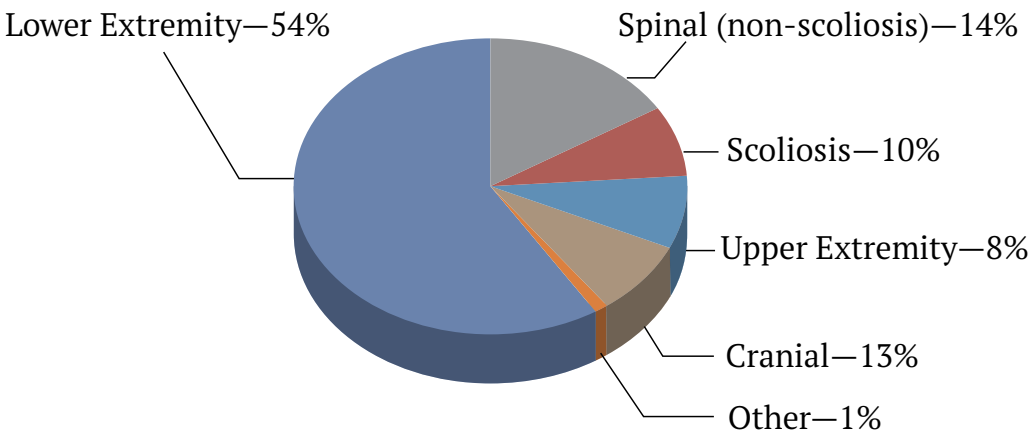
Participants who indicated that they had provided direct patient care in the last 12 months were presented with a section covering either orthotic or prosthetic practice areas, as well as additional discipline-specific questions. Participants were directed to the orthotics or prosthetics section based on the discipline track they were assigned for the survey depending on their credential (CO or CP) or their preference for dually credentialed (CPO) practitioners. The results of these ratings provide guidance with regard to the development and/or refinement of ABC's certification examinations. The results also provide guidance to the National Commission on Orthotic and Prosthetic Education (NCOPE) in the development of orthotic and prosthetic residency and education standards.

Orthotic Practice Areas and Orthoses

Orthotics-track respondents were asked to rate the percentage of time they spend in various orthotic practice areas. Figure 1 shows the average overall allocation of orthotic practitioners' time in the practice areas. As can be seen, practitioners spend more than half of their time in the lower extremity practice area. There was a decrease in the percentage of time spent in lower extremity from the 2015 study (from 59% to 54%). The cranial practice area increased by 5% from the previous study and the scoliosis area also saw a small increase. These changes are consistent with the notable increase in the percentage of patients in the pediatric age range seen by orthotists.

Figure 1

Percentage of Time in Orthotic Practice Areas



Participants were then asked to indicate the percentage of time they spend on each of the orthotic device types that were delineated within each of the five practice areas, as shown in Table 25.

Table 25

Percentage of Time Spent on Orthoses Within Orthotic Practice Areas

	Area	Orthoses
1. LOWER EXTREMITY	**54%**	
Orthopedic/Diabetic shoes		4.5%
Custom shoes		0.8%
Shoe modifications		1.5%
FO/UCBL (including diabetic insert)		6.8%
Partial foot insert		1.7%
Foot abduction orthosis/Denis Browne/ Ponseti		1.6%
SMO		5.5%
AFO		18.5%
FES		0.3%
KO		4.8%
KAFO		3.3%
HO		1.2%
HKAFO/RGO		0.7%
Dynamic contracture orthosis		1.1%
Prosthesis/hybrid device (e.g., foot-on-foot)		0.5%
Fracture orthosis		1.5%
Other		0.2%
Total		54.4%
2. SPINAL (NON-SCOLIOSIS)	**14%**	
LSO/TLSO semi-rigid		4.9%
LSO rigid		1.5%
Hyperextension TLSO (including Jewett or CASH)		1.2%
TLSO rigid		3.6%
CTLSO		0.3%
CTO (including Minerva and non-invasive halo)		0.4%
CO		1.3%

	Area	Orthoses
2. SPINAL (NON-SCOLIOSIS)—*CONTINUED*	**14%**	
Halo		0.2%
Other		0.2%
Total		13.5%
3. SCOLIOSIS	**10%**	
LSO		0.8%
TLSO		8.3%
CTLSO (Milwaukee)		0.2%
Tension-based scoliosis orthosis		0.5%
Other		0.2%
Total		10.0%
4. UPPER EXTREMITY	**8%**	
Wrist/Hand Orthoses (WHFO, WHO, HO, FO)		5.1%
EWHO		0.3%
EO		0.9%
SEWHO		0.2%
SO		0.3%
Dynamic contracture orthosis		0.3%
Fracture orthosis		1.1%
Other		0.1%
Total		8.3%
5. CRANIAL	**13%**	
Protective helmet (soft or rigid)		3.4%
Cranial remolding orthosis		9.3%
Other		0.1%
Total		12.8%
6. OTHER	**1%**	
Protective or burn facemask		0.1%
Dynamic chest compression or Pectus carinatum orthosis		0.2%
Compression garments and wraps		0.3%
Therapeutic postural-control garments (Theratogs, Wunzies)		0.1%
Soft tissue and organ protector		0.0%
Other		0.1%
Total		0.9%

In the orthotics-specific section, participants answered a series of additional questions about the orthoses they provided within the last 12 months. Results are shown below in Tables 26–34.

Table 26

Percentage of KAFOs and HKAFOs in Each Category

Conventional (metal, leather)	12%
Thermoplastic	73%
Thermoset/Composite	14%
Additive manufactured (i.e., 3D printed)	1%
Total	100%

The percentage of stance control KAFOs provided by orthotists decreased from 9% in the 2015 study to 6%, as shown in Table 27.

Table 27

Percentage of KAFOs in Each Category

Mechanical (e.g., posterior offset, drop locks)	92%
Stance control	6%
Microprocessor	1%
Total	100%

Custom fit (prefabricated) AFOs are more often provided than the previous study. This category increased from 18% to 22%.

Table 28

Percentage of AFOs in Each Category

Custom fabricated to patient model	71%
Custom fabricated to patient measurement	7%
Custom fit (prefabricated devices)	22%
Total	100%

Table 29

Percentage of Custom AFOs in Each Category

Thermoplastic	78%
Carbon fiber	14%
Additive manufactured (i.e., 3D printed)	1%
Conventional (metal, leather)	7%
Other	1%
Total	100%

There was a significant shift in the type of prefabricated AFOs provided by orthotists. Carbon fiber type orthoses increased from 72% in the 2015 study to 82%. A similar decrease in thermoplastic AFOs was seen, from 27% to 14%.

Table 30

Percentage of Prefabricated AFOs in Each Category

Thermoplastic	14%
Carbon fiber	82%
Additive manufactured (i.e., 3D printed)	1%
Other	3%
Total	100%

There was a major change in the percentage of AFOs provided that utilized the AFO footwear combination, tuning or dynamic alignment method. In 2015 orthotists reported that they used one of these methods in only 18% of the AFOs they provided. That percentage grew to 44%. This may be due to the addition of dynamic alignment to the survey question in this study.

Table 31

Percentage of AFO Fittings Utilizing the AFO Footwear Combination, Tuning Method, or Dynamic Alignment

Total Fittings	44%

Orthotists reported providing more prefabricated spinal orthoses than in 2015. The percentage for this category increased from 40% to 52%. Both the other categories, custom fabricated to patient model and custom fabricated to patient measurement, decreased from the 2015 study.

Table 32

Percentage of Spinal (Non-scoliosis) Orthoses in Each Category

Custom fabricated to patient model	20%
Custom fabricated to patient measurement	28%
Custom fit (prefabricated devices)	52%
Total	100%

Table 33

Percentage of Scoliosis Orthoses in Each Category

Nocturnal (supine)	26%
Full time (non-supine)	74%
Total	100%

Table 34

Percentage of Patients in Each Practice Area for Whom Digital Shape Capture Was Utilized

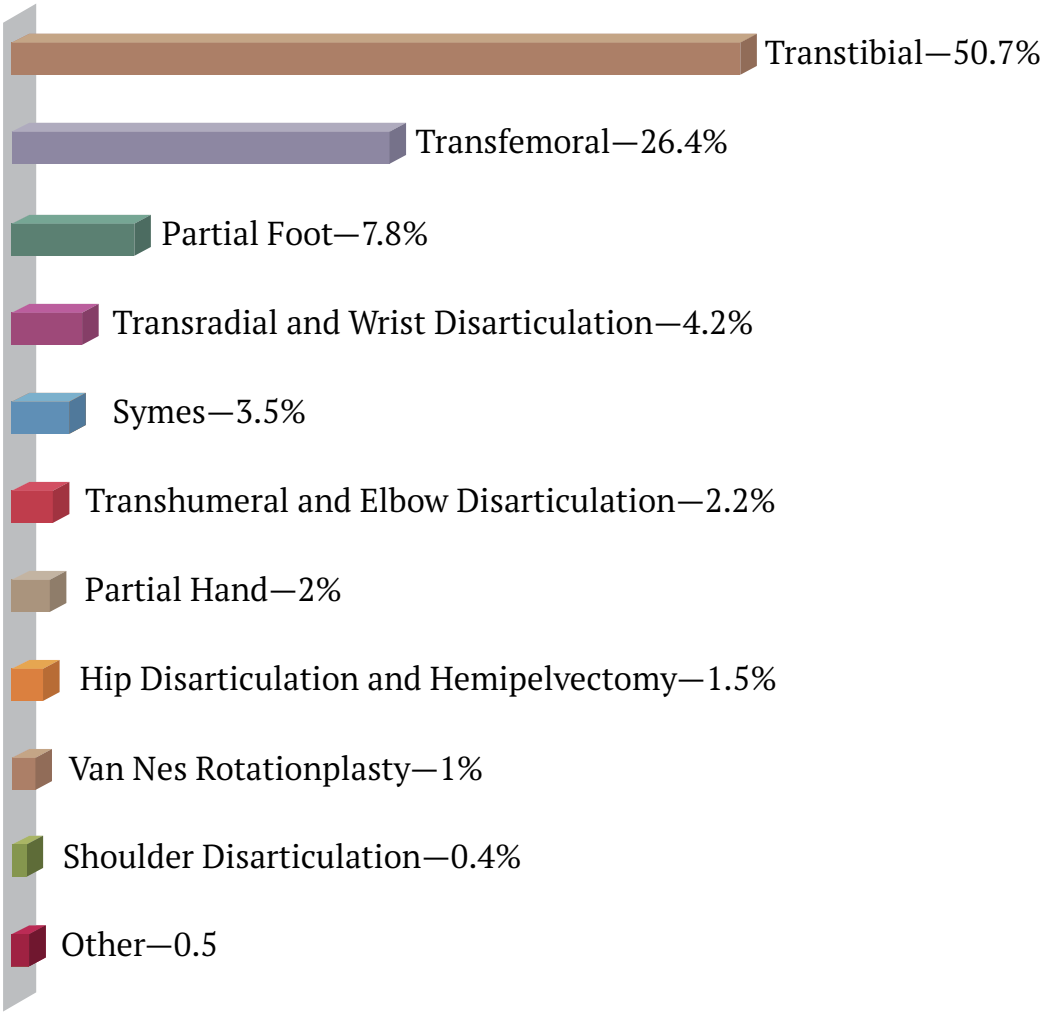
Foot orthoses (non-diabetic inserts)	22%
Foot orthoses (diabetic inserts)	25%
Lower extremity	11%
Spinal	17%
Scoliosis	35%
Upper extremity	1%
Cranial	55%

Prosthetic Practice Areas and Prostheses

Prosthetics-track respondents were asked to rate the percentage of time they spend in various prosthetic practice areas. Figure 2 shows the average overall allocation of prosthetic practitioners' time in the practice areas. As can be seen, practitioners spend more than half of their time in the transtibial practice area and just more than a quarter of their time in the transfemoral/knee disarticulation area. The only other practice area that prosthetists spend more than 5% of their time in was partial foot at about 8%.

Figure 2

Percentage of Time in Prosthetic Practice Areas



Participants were then asked to indicate the percentage of prostheses that incorporated the listed socket designs, suspension systems, and control systems. Table 35 lists the percentages for the socket designs, suspension systems, and control systems within each of six practice areas.

Half of the transtibial socket designs reported were a hybrid design. Prosthetists were most likely to use a roll-on liner with lock or lanyard, reporting that they use this type of suspension system in almost half of their transtibial interventions.

More than three quarters of the transfemoral prostheses provided incorporate an ischial containment socket design. Similar to the transtibial area, prosthetist most commonly used a roll-on liner with lock or lanyard, reporting they use this suspension system in half of their transfemoral/knee disarticulation patients.

In both of the upper extremity practice areas, prosthetists continue to be more likely to provide a body-powered versus a myoelectric control system.

Table 35

Prosthetic Practice Areas, Sockets, Suspensions and Control Systems

PRACTICE AREA	Area	Socket Designs/ Suspension Systems
1. TRANSTIBIAL	**51%**	**% of Practice**
Socket Designs		
Patella tendon bearing		5.7%
Total surface bearing		19.3%
Hybrid		25.7%
Suspension Systems		
Supracondylar or anatomical		2.3%
Joints and corset		0.6%
Waist belt only		0.2%
Cuff or strap suspension		0.4%
Sleeve only		3.6%
Roll-on liner with lock or lanyard		22.7%
Roll-on liner, suction with other accessories (seal or sleeve)		15.4%
Vacuum-assisted		5.5%

PRACTICE AREA	Area	Socket Design/ Suspension System
2. TRANSFEMORAL AND KNEE DISARTICULATION	**26%**	**% of Practice**
Socket Designs		
Distal end bearing		1.0%
Quadrilateral		1.1%
Ischial containment		20.1%
Ramal containment (e.g., M.A.S. design)		0.9%
Sub-ischial		3.3%
Suspension Systems		
Hip joint/pelvic band/waist belt		0.5%
Suction suspension with expulsion valve (skin fit)		3.3%
Roll-on liner with lock or lanyard		13.1%
Roll-on liner, suction with other accessories (seal, sleeve)		7.9%
Vacuum-assisted		1.0%
Anatomical suspension		0.6%

PRACTICE AREA	Area	Control System/ Suspension System
3. TRANSRADIAL AND WRIST DISARTICULATION	**4%**	**% of Practice**
Control Systems		
Passive and/or aesthetic		0.4%
Body-powered		2.1%
Myoelectric (one- or two-site systems)		1.4%
Myoelectric (pattern recognition or TMR)		0.3%
Suspension Systems		
Harness		1.6%
Suction suspension (skin fit)		0.8%
Roll-on liner with lock or lanyard		0.5%
Roll-on liner, suction with other accessories (seal, sleeve)		0.2%
Anatomical suspension		1.1%

PRACTICE AREA	Area	Control System/ Suspension System
4. TRANSHUMERAL AND ELBOW DISARTICULATION	**2%**	**% of Practice**
Control Systems		
Passive and/or aesthetic		1.2%
Body-powered		0.4%
Myoelectric (one- or two-site systems)		0.3%
Myoelectric (pattern recognition or TMR)		0.1%
Hybrid, myo/body-powered		0.3%
Suspension Systems		
Harness		1.2%
Suction suspension (skin fit)		0.4%
Roll-on liner with lock		0.4%
Roll-on liner, suction with other accessories (seal, sleeve)		0.1%
Anatomical suspension		0.0%

PRACTICE AREA	Area	Socket Designs/ Suspension Systems
5. SYMES	**4%**	**% of Practice**
Socket Designs		
Patella tendon bearing		0.7%
Total surface bearing		1.6%
End bearing		1.2%

PRACTICE AREA	Area	Socket Designs/ Suspension Systems
5. SYMES	**4%**	**% of Practice**
Suspension Systems		
Self-suspending (via pad or soft insert)		1.4%
Removable window/door		1.5%
Expandable wall		0.2%
Roll-on liner with expulsion valve		0.3%

PRACTICE AREA	Area	Characteristics
6. PARTIAL FOOT	**8%**	**% of Practice**
In-shoe submalleolar		4.8%
Ankle height supramalleolar		0.8%
Any tibial height		2.2%

In the prosthetics-specific section, participants answered a series of additional questions about the prosthetic devices they provided within the last 12 months. Results are shown below in Tables 36-42.

Table 36

Percentage of Lower Extremity Prosthetic Patients at Each Functional Level

K1	7%
K2	39%
K3	45%
K4	9%
Total	100%

The biggest changes seen in the prosthetic feet category versus the 2015 study was in the percentage of feet in the hydraulic category. This category doubled from 6% to 12% and the SACH category decreased from 8% to 4%.

Table 37

Percentage of Prosthetic Feet in Each Category

SACH	4%
Single axis	4%
Flexible keel	22%
Dynamic response	32%
Dynamic response shank foot system with vertical loading	18%
Hydraulic	12%
Microprocessor controlled, powered foot and ankle systems	3%
Running/sports	4%
Other	1%
Total	100%

The categories of prosthetic knee components were expanded, and additional specificity was added to the choices. This makes comparison to the previous study difficult. The microprocessor category did increase from 19% to 26%. One factor may be the inclusion of powered type of microprocessor knees, which was not listed in the 2015 survey.

Table 38

Percentage of Prosthetic Knees in Each Category

Manual lock	11%
Single axis constant friction	4%
Single axis with pneumatic/hydraulic control	10%
Weight activated stance control	20%
Polycentric constant friction	9%
Polycentric with pneumatic/hydraulic control	20%
Microprocessor, including powered	26%
Other	1%
Total	100%

The biggest change in the type of terminal device provided to upper extremity prosthetic patients was in the multi-articulated hand (e.g., I-Limb, Bebionic) category. Prosthetists reported using this type of terminal device 18% of the time compared to 10% previously.

Table 39

Percentage of Terminal Devices in Each Category

Body powered hook	44%
Externally powered hook	4%
Body powered hand	9%
Externally powered hand	12%
Multi-articulated hand (e.g., I-Limb, Bebionic)	18%
Activity-specific (e.g., sports, vocational)	7%
Other	5%
Total	100%

Prosthetists reported spending 39% of their work time in clinical prosthetic patient care. (See Table 13) Of that time, respondents spent 6% performing pre-operative consultations and 29% performing post-operative consultations, as shown in Table 40.

Table 40

Time Spent in Prosthetic Clinical Patient Care Performing Pre- and Post-operative Consultations

Pre-operative	6%
Post-operative	29%

In the 2015 study, prosthetists reported that they incorporated CAD/CAM in 23% of the prostheses they provided. This percentage has increased to 30%.

Table 41

Percentage of Custom Prostheses That Incorporated CAD/CAM

Total CAD/CAM	30%

Table 42 represents a new survey question asked for the first time in this study.

Table 42

Percentage of Patients in Each Practice Area for Whom Digital Shape Capture Was Utilized

Partial foot	11%
Transtibial	33%
Transfemoral	34%
Upper extremity	7%

METHOD

The practice analysis study of the O&P practitioner profession and the practitioner exam specifications involved a multi-method approach that included preliminary research, meetings with subject matter experts, and a survey. This section of the report describes the activities conducted for the practice analysis study.

STEPS OF THE PRACTICE ANALYSIS STUDY

1. Conduct of role delineation research
2. Development of the survey instrument
3. Dissemination of the survey
4. Analysis of the survey data
5. Development of the test specifications

First, experts conducted research and identified the tasks, knowledge, and skills that they believed were important to the professional work done by O&P practitioners. Then, a survey was developed and disseminated to O&P practitioner professionals. The purpose of the survey was to obtain verification (or refutation) that the tasks, knowledge, and skills identified by the experts are important to the work of O&P practitioner professionals. Survey research functions as a "check and balance" on the judgments of the experts and reduces the likelihood that unimportant areas will be considered in the development of the test specifications. The use of a survey is also an efficient and cost-effective method of obtaining input from large numbers of experts and makes it possible for analysis of ratings by appropriate subgroups of respondents.

The survey results provide information to guide the development of test specifications and content-valid examinations. What matters most is that a certification examination covers the important tasks, knowledge, and skills needed to perform job activities.

The steps of the practice analysis study are described in detail below:

1. Conduct of Role Delineation Research

ABC's testing consultant, Prometric, in collaboration with ABC staff, conducted a review of available materials to develop draft task, knowledge, and skill statements. The primary source of information was the previous practice analysis study conducted in 2014. The tasks, knowledge and skills, practice areas, and additional questions from the previous survey were organized and prepared for review, revision, and validation by the members of the task force. Additional information from ABC regarding emerging trends and new areas of practice was also incorporated, as appropriate.

2. Development of the Survey

Conduct of the Practice Analysis Study Task Force Meeting

A task force meeting was held to develop the survey content, primarily consisting of the validated task, knowledge and skill statements, and practice areas and orthoses/prostheses.

The task force was comprised of a group of ABC certified orthotists and prosthetists, who were selected to represent various levels of education, practice setting, job role, years of experience, and geographical diversity. In total, 21 volunteers comprised the task force. Table 43 summarizes their characteristics.

Table 43

Characteristics of the Task Force Members

Characteristic		Count
Current primary job role	Patient care	13
	Management	6
	Training/education	2
Year obtained ABC practitioner certification (CPO, CP, or CO)	2016–2020	6
	2006–2015	4
	1996–2005	3
	1986–1995	8
Total years of experience in O&P	5 years or fewer	4
	6–10 years	3
	11–20 years	3
	21 years or more	11
Geographic region	Midwest	3
	Northeast	3
	Southeast	8
	Southwest	4
	West	3
Highest education completed	Bachelor's degree	10
	Master's degree	11
Practice Setting	Single/Private	4
	Multi/Private	5
	Multi/Public	5
	Educ/Hospital	5
	Manufacturer	2

Activities conducted during the meeting included reviewing and revising the major domains, tasks, knowledge, and skills that are necessary for competent performance of the work that O&P practitioners do. Survey rating scales and background and general information questions were also presented, discussed, and revised as needed.

Survey Construction and Task Force Review

Upon the completion of the task force meeting, Prometric staff constructed the draft online survey. Each task force member then received a link to review the draft survey. The purpose of the review was to provide the task force with an opportunity to view their work and recommend any revisions.

Comments provided by the task force members were compiled by Prometric staff and reviewed with the task force members. Refinements, as recommended by consensus of the task force, were incorporated into the online survey in preparation for a pilot test.

Survey Pilot Test

The goal of the small-scale pilot test was for professionals in the field who had no previous involvement in the development of the survey to review the instrument and offer suggestions for improvement. Pilot participants reviewed the survey for clarity of wording, ease of use, and comprehensiveness of content coverage. Comments were compiled by Prometric staff and reviewed with the task force members. The task force revised and finalized the survey based on the review of the pilot test comments.

Final Version of the Survey

The final version of the online survey consisted of eight sections:

- SECTION 1: **Tasks**
- SECTION 2: **Domains of Practice**
- SECTION 3: **Knowledge and Skills**
- SECTION 4: **Orthotic Practice Areas, Orthoses, and Additional Questions**
  OR
  Prosthetic Practice Areas, Devices, and Additional Questions
- SECTION 5: **Work and Patient Characteristics**
- SECTION 6: **Test Content Weightings**
- SECTION 7: **Background & General Information**
- SECTION 8: **Comments**

In Survey Section 1: Tasks

Job task statements were organized into the practice domains shown in Table 44.

Table 44

Practice Domains Covered in the Survey

Practice Domains
Patient Evaluation
Formulation of the Treatment Plan
Implementation of the Treatment Plan
Continuation of the Treatment Plan
Practice Management
Promotion of Professional Practice

Participants rated each statement using the importance and frequency scales shown in Table 45. Added emphasis was given to the Importance rating descriptions to clearly describe how respondents were to rate based on a newly certified practitioner. The Frequency rating related to the respondent's own work experience. This was a change from the 2015 survey, which used the term Criticality instead of Importance, and where both questions referred to the respondent themselves, and not to a newly certified practitioner.

Table 45

Task Rating Scales

IMPORTANCE How important is this task for a **NEWLY CERTIFIED** orthotist's and/or prosthetist's job performance?	**FREQUENCY** On average, how frequently do **YOU** perform the task in YOUR current position?
0 = Of no importance	0 = Never/not applicable
1 = Of little importance	1 = Quarterly or less
2 = Of moderate importance	2 = Monthly
3 = Important	3 = Weekly
4 = Very important	4 = Daily

In Survey Section 2: Domains of Practice

Participants indicated the percentage of time they spend performing tasks related to each domain during the most recent 12 months in which they provided direct patient care.

In Survey Section 3: Knowledge and Skills

Survey participants rated the knowledge and skill statements using the importance scale shown in Table 46.

Table 46

Knowledge and Skills Rating Scale

IMPORTANCE How important is this knowledge of skill for a **NEWLY CERTIFIED** orthotist's and/or prosthetist's job performance?
0 = Of no importance
1 = Of little importance
2 = Of moderate importance
3 = Important
4 = Very important

For Survey Section 4: Orthotic OR Prosthetic Practice Areas, Orthoses OR Devices, and Additional Questions

The survey used branching to direct participants to orthotics or prosthetics discipline-specific content. At the beginning of the survey, participants had been asked which credential they held. COs and CPs were automatically classified as orthotics and prosthetics, respectively. CPOs were given an additional question to select whether they primarily practice in orthotics or prosthetics, and/or to indicate which discipline they prefer for the discipline-specific sections. Participants only responded to Section 4 if they had provided direct patient care in the past 12 months. The section consisted mainly of a series of questions related to percentage of time in practice areas, as well as other discipline-specific questions.

In Survey Section 5: Work and Patient Characteristics

Participants gave additional percentage of time ratings in areas such as work setting or patient characteristics.

In Survey Section 6: Background & General Information

Survey participants responded to general and background information questions about themselves and their professional activities.

3. Dissemination of the Survey

ABC disseminated the survey to all ABC certified orthotists, prosthetists and prosthetist/orthotists (n=5,504 on the date of dissemination). The survey remained open for five weeks. The invited survey participants received two reminder emails prior to the survey's close.

4. Analysis of the Survey Data

As previously noted, the purpose of the survey was to validate the tasks, knowledge, and skills that relatively large numbers of O&P practitioner professionals judged to be relevant (verified as important) to their work. This objective was accomplished through an analysis of the mean importance ratings for task, knowledge, and skill statements. The derivation of test specifications from those statements verified as important by the surveyed orthotists and prosthetists provides a substantial evidential basis for the content validity of credentialing examinations. For the purposes of this study, survey respondents were categorized as orthotics or prosthetics and analyzed in parallel.

Based on information obtained from the survey, further data analyses by respondent subgroups (e.g., work setting, specialization, years of experience) are possible when sample size permits. A subgroup category was required to have at least 30 respondents to be included in the mean analyses. This was a necessary condition to ensure that the mean value based upon the sample of respondents is an accurate estimate of the corresponding population mean value.

The following quantitative data analyses were produced:

- Means, standard deviations, and frequency (percentage) distributions for task importance and content coverage ratings
- Means, standard deviations, and frequency (percentage) distributions for task frequency ratings
- Means, standard deviations, and frequency (percentage) distributions for knowledge and skill statements
- Means and standard deviations for orthotic/prosthetic practice area ratings

5. Development of the Test Specifications

The task force held a meeting to review the survey results and to develop test specification recommendations based on the practice analysis results. The goals of the meeting were to:

1. Finalize the list of tasks, knowledge, and skills required upon entry to the profession
2. Recommend final exam content weightings for five exams:
    - Combined O&P Written Multiple-Choice Exam
    - Orthotic Written Simulation Exam
    - Prosthetic Written Simulation Exam
    - Orthotic Clinical Patient Management Exam
    - Prosthetic Clinical Patient Management Exam

The steps involved in the development of test specifications included the following:

- presentation of the practice analysis survey results
- finalization of the tasks, knowledge, and skills that are important for inclusion based on the survey results
- establishing the percentage test content weights for each area on each examination
- creating a linkage between the tasks and knowledge/skills

The main purpose of finalizing the task, knowledge, and skill statements and developing test content weights is to guide examination development activities. The test specifications for each of the orthotic and prosthetic practitioner exams are available on ABC's website.

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

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