

PRACTICE ANALYSIS OF ORTHOTIC AND PROSTHETIC TECHNICIANS



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Acknowledgements

On behalf of the American Board for Certification in Orthotics, Prosthetics and Pedorthics, Inc. (ABC) I am pleased to present this *Practice Analysis of Orthotic and Prosthetic Technicians*. This report describes the contemporary work of Orthotic and Prosthetic technicians practicing in the United States. It represents the culmination of months of planning, execution, data analyses and writing.

A project of this magnitude depends on the hard work and commitment of many professionals. We are indebted to the ABC Practice Analysis Task Force (PATF) for the wisdom and direction it provided. Its members—Anthony P. Wickman, RTPO (Chair), William D. Beiswenger, CPO, FAAOP, Chris J. Harrigan, RTP, Timothy E. Miller, CPO, and Steven R. Whiteside, CO, FAAOP—worked with us diligently throughout the conduct of the study

Finally, we are grateful to ABC staff, including Catherine A. Carter, Executive Director, and Stephen B. Fletcher, CPO, Director of Clinical Resources. Ms. Carter provided thoughtful and consistent support for the study, and assisted in publicizing the study outside of the pool of ABC-registered technicians to enable us to include non-registered technicians in the sample. She developed a highly effective communications program regarding the conduct of the study and the dissemination of the results.

This project represents a substantial investment of ABC's financial resources and personnel as related to our efforts in continuing to develop exemplary examination programs as well as providing information to primary and continuing education programs. We are proud to present this to the profession.

Robert S. Lin, CPO, FAAOP
President

Introduction

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 orthotic and prosthetic technicians. To accomplish the objectives of the study, PES worked with ABC's Executive Director and a Practice Analysis Task Force (PATF) over the course of a 9-month period during 2009.

ABC performed a technician practice analysis and validation study in 1999. In 2009, as planned, technicians were resurveyed in order to identify changes related to the delivery of care, the components available and the technology in use today.

The respondents to the survey have provided a great service to the profession. It is imperative that technicians and the profession 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 the provision of prosthetic and orthotic services by technicians.

Why do a validation study?

The goal of the validation study was to identify priorities unique in the delivery of orthotic and prosthetic care, e.g., What highly critical tasks are performed by all technicians? What subset of knowledge and skills is essential? 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 technicians. The results will also be used to identify specific topics for in-service and/or continuing education, and to provide guidance for educational program enhancement in regard to curriculum review and/or programmatic self-assessment.

The specific objectives of the study were to:

- conduct a comprehensive practice analysis of the disciplines of orthotic and prosthetic technicians by updating and validating the domains of practice, the specific tasks performed, and the associated knowledge and skills required to perform each task;
- quantify time spent and tasks performed with regard to various orthotic and prosthetic devices; and
- develop defensible test specifications for the disciplines of orthotic and prosthetic technicians in connection with the credentialing examinations for Registered Technicians.

PES completed the following steps in collaboration with the PATF:

- Conducted one meeting of the PATF

- Revised the delineation and more closely aligned it with that developed for other ABC credentialing programs

PES developed and conducted an online survey, the *Practice Analysis Survey of Orthotic and Prosthetic Technicians*. The survey comprised two versions, including alternate forms of Section 4, as described below:

- Introduction, including a description of the purpose of the survey and instructions for completing the survey.
- Screening questions, to ensure that the respondents were currently working as an orthotic and/or prosthetic technician, and asking them to choose the perspective (orthotic or prosthetic technician work) from which they would complete the survey.
- Section 1: Tasks, including 45 tasks delineated in association with six domains of practice.
- Section 2: Domains, including six domains of practice.
- Section 3: Knowledge and Skills, including 36 knowledge statements and 18 skill statements.
- Section 4 (Two Versions): Depending on the perspective respondents chose in the screening question, either Orthotic *or* Prosthetic Practice Areas and Device Lists, including percent of technician work time spent in areas of practice and activities performed in connection with orthotic and prosthetic devices.
- Section 5: Background Information, including questions about the respondent's percentage of work time, educational and professional background, work setting and demographic characteristics.

Survey Return Rate

The overall response rate was 34.5%. This was derived by dividing the number of completed surveys by the number of valid invitations sent, defined as the number of invitations emailed minus those returned as undeliverable. Two hundred thirty-six technicians completed the survey, of which 147 were ABC Registered Technicians (RTs) and 89 were non-registered technicians. This is a very good response rate for a long and complex online survey such as the present study, and is comparable to response rates achieved in surveys of other professions. In particular, the responses from non-registered technicians, who have no stake in the sponsoring agency, lend credibility to the results as well as permitting comparison between cohorts of respondents.

Section One:

Results Related to Professional Background, Work Setting and Demographic Information

As documented in Tables 1, 2 and 3, respondents were most likely to be in their early 40s, male (91%), and Caucasian/white (86%),

**Table 1:
Gender**

	n	%
Male	212	90.6%
Female	22	9.4%

**Table 1:
Age**

	Mean
Age	42.3

**Table 3:
Racial/Ethnic Background**

	n	%
American Indian/Eskimo/Aleut	2	.9%
Asian or Pacific Islander	6	2.6%
African American/Black	10	4.3%
Caucasian/White (non-Hispanic)	197	85.7%
Hispanic/Latino/Latina	13	5.7%
Multiracial	1	.4%
Other	1	.4%

In regard to highest educational degree, respondents were most likely to indicate that they had earned a HS/GED and an O/P technician certificate (35%), and were less likely to indicate that their highest educational level was a HS/GED (17%), an associate’s degree (12%), or a baccalaureate degree (11%) (see Table 4).

**Table 4:
Highest Educational Degree/Certificate/Diploma**

	n	%
HS/GED	41	17.2%
HS/GED and O/P short-term courses	21	8.8%
HS/GED and O/P technician certificate	83	34.9%
AA/AS	29	12.2%
AA/AS in O/P	20	8.4%
BA/BS	27	11.3%
Master's degree (MA, MA, MBA, etc.)	4	1.7%
Other	13	5.5%

On average, respondents to the survey had about 15 years of experience (Table 5).

**Table 5:
Years of Experience**

Mean
14.5

As documented in Table 6, respondents were most likely to describe their primary work setting as part of a publicly owned multi-facility orthotics and/or prosthetics practice and about equally likely to describe their primary work setting as a hospital-based practice (19%) or a privately-owned single-location orthotic and/or prosthetic practice (15%). Respondents were somewhat less likely to work in either a privately-owned multi-facility orthotics and prosthetics practice (11%) or a privately-owned central fabrication center. Respondents were least likely to work in either a publically-owned central fabrication center (3%) or a university-based practice (3.8%).

**Table 6:
Primary Work Setting**

	n	%
Part of a multi-facility orthotic and/or prosthetic practice, publicly owned	77	32.6%
Part of a multi-facility orthotic and/or prosthetic practice, privately owned	27	11.4%
Single-location orthotic and/or prosthetic practice, privately owned	36	15.3%
Central fabrication center, publicly owned	7	3.0%
Central fabrication center, privately owned	26	11.0%
Hospital-based practice	44	18.6%
University-based practice	9	3.8%
Other	10	4.2%

As documented in Table 7, respondents were most likely to describe themselves as employees of a multi-facility orthotics and/or prosthetics practice (56%) and less likely to describe themselves as employees of a single location orthotic/prosthetic practice.

**Table 7:
Primary Position**

	n	%
Employee of single location orthotic/prosthetic practice	59	25.0%
Employee of a multi-facility orthotic and/or prosthetic practice	131	55.5%
Employee of fabrication company	13	5.5%
Owner of fabrication company	15	6.4%
Other	18	7.6%

Respondents were asked to document the way they spend their time. Respondents who completed the survey from the orthotics perspective indicated that they spend about two thirds of their time in orthotic fabrication and less than 9% of their time in any other specifically-delineated function (see Table 8).

**Table 8:
Percent of Work Time, Orthotic Perspective**

	Mean %
Orthotic fabrication	66%
Prosthetic fabrication	9%
Clinical orthotic patient care under direct supervision	4%
Clinical orthotic patient care, unsupervised	6%
Clinical prosthetic patient care under direct supervision	1%
Clinical prosthetic patient care, unsupervised	1%
Patient education	3%
Administration	8%
Other	2%

Percentage may not sum to 100% due to rounding

Respondents who completed the survey from the prosthetics perspective indicated that they spend about two thirds of their time in prosthetics fabrication (62%) and less than 6% of their time in any other specifically-delineated function (see Table 9).

**Table 9:
Percent of Work Time, Prosthetic Perspective**

	Mean %
Orthotic fabrication	16%
Prosthetic fabrication	62%
Clinical orthotic patient care under direct supervision	1%
Clinical orthotic patient care, unsupervised	2%
Clinical prosthetic patient care under direct supervision	5%
Clinical prosthetic patient care, unsupervised	5%
Patient education	3%
Administration	6%
Other	1%

Percentage may not sum to 100% due to rounding

As documented in Table 10, respondents were overwhelmingly most likely to indicate that they worked with between 1 – 5 other orthotic/prosthetic technicians.

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

	n	%
1-5	190	80.9%
6-10	31	13.2%
11-15	6	2.6%
16 or more	8	3.4%

More than two thirds of the respondents indicated that they worked with between 1 – 5 orthotic/prosthetic practitioners (70%), while 21% worked with between 6 – 10 orthotic/prosthetic practitioners (see Table 11).

**Table 11:
Number of Orthotic/Prosthetic Practitioners at Primary Work Setting**

	n	%
1-5	159	69.7%
6-10	47	20.6%
11-15	16	7.0%
16 or more	6	2.6%

ABC Registered Technicians indicated multiple reasons for obtaining the credential (see Table 12). They were most likely to indicate that increased pay (65%), job opportunities (64%), and responsibility (62%) were the primary reasons for obtaining the credential, although they also indicated increased respect (56%) or independence (53%).

**Table 12:
Reasons for Obtaining ABC Registered Technician Credential**

	n	%
Increased independence	78	53.1%
Increased responsibility	91	61.9%
Increased respect	82	55.8%
Increased job opportunities	94	63.9%
Increased pay	95	64.6%
Other	19	12.9%

Respondents could choose all that applied. Answers do not sum to 100%

Respondents were asked to indicate the ABC credentials they held. As seen in Table 13, respondents were most likely to hold the RTP credential (25%) or the RTPO credential (22%). Respondents were somewhat less likely to hold the RTO credential (15%) or the CFo credential (13%). Fewer than 2% of the respondents had earned any other specifically-delineated ABC credential.

**Table 13:
All ABC Credentials Held**

	n	%
RTO	36	15.3%
RTP	58	24.6%
RTPO	52	22.0%
RAO	3	1.3%
RAP	3	1.3%
RAPO	1	.4%
CFo	30	12.7%
CFm	1	.4%
CFom	0	.0%
CFts	0	.0%
CPed	3	1.3%
CP	3	1.3%
CO	4	1.7%
CPO	0	.0%
None	72	30.5%

Respondents could choose all that applied. Answers do not sum to 100%

Respondents indicated that slightly less than 20% of the orthoses/prostheses fabricated at their work sites were fabricated using CAD/CAM (see Table 14).

**Table 14:
Percent of Orthoses/Prostheses Fabricated
Using CAD/CAM**

	Mean %
Percent of orthoses/prostheses fabricated incorporating CAD/CAM	19.1%

Respondents completing the survey from the orthotics perspective indicated that 84% of their orthotic devices were fabricated onsite (see Table 15).

**Table 15:
Percent of Orthotic Devices Fabricated Onsite or Outsourced**

	Mean %
% Onsite	84.1%
% Outsourced	15.9%

Respondents completing the survey from the prosthetics perspective indicated that 93% of their prosthetic devices were fabricated onsite (see Table 16).

**Table 16:
Percent of Prosthetic Devices Fabricated Onsite or Outsourced**

	Mean %
% Onsite	93.1%
% Outsourced	6.9%

Section Two:

Results Related to Domains, Tasks, Knowledge and Skill Statements

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

Tasks are the activities performed within a domain of practice.

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

Domain Ratings: Profiles of Practice

This section presents the results of the ratings related to the six domains delineated in the survey. As described previously, respondents to the survey rated each of the domains on two ratings scales:

- *% 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 healthcare providers?

Table 17 presents the results of the *% of Time* estimates for both registered and non-registered technicians. As can be seen, members of both cohorts indicated that they spend the most time performing tasks associated with *Implementation of Orthotic/Prosthetic Requirements* (49% and 51% for registered and non-registered technicians, respectively) and relatively equivalent amounts of time in connection with each of the other five specifically-delineated domains (between 7% and 12% in each domain).

As documented in Table 18, the mean *Criticality* rating for the domain in which they spend about one half of their time, *Implementation of Orthotic/Prosthetic Requirements*, indicates that this domain is between moderately and highly. The mean *Criticality* ratings for the other five specifically-delineated domains indicate that these domains are all rated as approaching moderately critical. Accordingly, all six domains appropriately focus on activities that are critical to optimizing outcomes for patients, caregivers and healthcare providers.

Overall, these two tables provide a profile of practice for orthotic and prosthetic technicians. They can be used to describe the profession to individuals in related healthcare professions and to the public. The profiles of practice can be used by academic programs as a means of assessing curricular offerings and/or program requirements. Similarly, the profiles of practice can be used by providers of in-service education to plan course offerings, including entry-level and/or advanced-level workshops. Finally, the profiles of practice can be used by supervisors and/or employers in order to develop job descriptions and/or performance evaluation forms.

**Table 17:
Percent of Work Time by Domain**

	Registered Technician	Not Registered	Total
	Mean	Mean	Mean
Domain 1. Assessment: Perform an assessment to obtain an understanding of the patient's orthotic/prosthetic needs	10%	9%	10%
Domain 2. Formulation of Orthotic/Prosthetic Requirements: Analyze and integrate information from the assessment to create an orthotic/prosthetic plan	12%	12%	12%
Domain 3. Implementation of Orthotic/Prosthetic Requirements: Perform procedures to provide an orthosis and/or prosthesis	49%	51%	50%
Domain 4. Follow-up Plan: Provide periodic evaluation to assure/maintain/document optimal fit and function of orthosis and/or prosthesis	8%	7%	8%
Domain 5. Practice Management: Develop, implement and/or monitor policies and procedures regarding the business environment	8%	5%	7%
Domain 6. Promotion of Competency and Enhancement of Professional Practice: Participate in personal and professional development	9%	9%	9%
Other	3%	7%	5%

**Table 18:
Domain Criticality Ratings**

	Registered Technician	Not Registered	Total
	Mean	Mean	Mean
Domain 1: Assessment	2.8	2.9	2.8
Domain 2: Formulation of Orthotic/Prosthetic Requirements	3.0	3.0	3.0
Domain 3: Implementation of Orthotic/Prosthetic Requirements	3.7	3.7	3.7
Domain 4: Follow-up Plan	2.9	2.7	2.8
Domain 5: Practice Management	2.6	2.5	2.6
Domain 6: Promotion of Competency and Enhancement of Professional Practice	3.1	2.9	3.0

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

Task Ratings

All survey respondents rated the tasks on two rating scales:

- *Frequency*: How frequently did you independently (without supervision) perform the task during the past year?
- *Criticality*: How critical is the task to optimizing outcomes for patients, caregivers and healthcare providers?

Table 19 displays the mean of the *Frequency* and *Criticality* ratings for the total sample of respondents. As can be seen, the *Frequency* ratings indicate technicians perform 35 of the 45 tasks associated frequently to very frequently (daily). They perform all but one of the remaining 10 tasks in those same domains occasionally to frequently. The one task that was performed never to rarely, *Ensure that responsible parties are informed of their financial responsibilities* (1.7) does not appear to readily lend itself to frequent performance. As can be seen in the *Criticality* ratings, 33 of 45 of the tasks were rated as between moderately and highly critical to optimizing outcomes for patients, caregivers and/or healthcare providers. The majority of the remaining tasks received ratings approaching moderately critical. The only one task clearly rated as minimally critical was the task with the lowest frequency rating, *Ensure that responsible parties are informed of their financial responsibilities*.

**Table 19:
Task Frequency Ratings**

	Mean Frequency	Mean Criticality
Domain 1: Patient Assessment		
Review physical assessment data provided by practitioner (e.g., height, weight, activity level, measurements, prior orthosis/prosthesis usage) to determine technical requirements for the orthosis/prosthesis	4.2	3.6
Collect physical assessment data (e.g., height, weight, activity level, measurements, prior orthosis/prosthesis usage; patient history) to determine orthotic/prosthetic needs	3.2	3.2
Document physical assessment data obtained (e.g., height, weight, activity level, measurements, prior orthosis/prosthesis usage; patient history)	3.0	3.1
Review range of motion requirements (e.g., varus/valgus, flexion, extension) of the individual to determine patient's orthotic/prosthetic needs	3.2	3.2
Determine orthosis/prosthesis design requirements (e.g., materials selection, component selection, structural requirements, device specific functional requirements)	4.0	3.6
Review patient's prescription/referral	2.4	2.6
Consult with practitioner(s) about patient's condition/diagnosis	3.9	3.4
Domain 2: Formulation of the Treatment Plan		
Evaluate the assessment findings to determine an orthotic/prosthetic treatment plan (e.g., orthosis/prosthesis design such as solid ankle versus posterior leaf spring [PLS], supracondylar versus patella tendon bearing [PTB])	2.6	2.8
Consult with manufacturing professionals, as required (e.g., regarding componentry, design limitations, new materials)	3.5	3.1

	Mean Frequency	Mean Criticality
Consult manufacturing guidelines, as required (e.g., regarding componentry, design limitations, materials)	3.9	3.4
Identify design, materials and components to support treatment plan	4.1	3.4
Determine fabrication requirements/technical criteria	4.4	3.6
Ensure that responsible parties are informed of their financial responsibilities	1.7	2.0
Consult with practitioners regarding fabrication requirements	4.2	3.5
Document the fabrication requirements	3.8	3.3
Domain 3: Implementation of the Treatment Plan		
Select materials/techniques necessary to obtain a patient model (e.g., fiberglass, plaster, scan)	3.0	2.8
Perform procedure to obtain patient model (e.g., measure patient, take impression, delineate, scan)	2.4	2.6
Modify patient model/image for fabrication	3.3	3.2
Fabricate/assemble an orthosis and/or prosthesis to prepare for initial or diagnostic fitting and/or delivery	4.7	3.7
Assess device for structural safety and ensure that manufacturers' guidelines have been followed prior to patient fitting/delivery (e.g., torque values, patient weight limits)	4.6	3.8
Assess/align orthosis and/or prosthesis for accuracy in sagittal, transverse and coronal planes in order to provide maximum function/comfort	2.6	2.9
Ensure that materials, design and components are provided as specified in the treatment plan	4.5	3.6
Complete fabrication process after achieving optimal fit and function of orthosis and/or prosthesis (e.g., convert test socket to definitive orthosis and/or prosthesis)	4.7	3.7
Educate patient and/or caregiver about the use of the orthosis/prosthesis (e.g., donning and doffing, wearing schedules, other instructions)	2.5	2.8
Educate patient and/or caregiver about the maintenance and care of the orthosis and/or prosthesis (e.g., cleaning, lubrication)	2.6	2.8
Document fabrication process (e.g., lamination materials, plastic thickness) using established record-keeping techniques	3.6	3.1
Document treatment (i.e., patient care) using established record-keeping techniques	2.4	2.7
Verify functional outcome of orthosis and/or prosthesis (e.g., does it perform as required)	4.0	3.4
Domain 4: Follow-up Treatment Plan		
Assess fit of orthosis and/or prosthesis to determine need for changes relative to initial treatment goals	2.4	2.8
Assess fit of orthosis and/or prosthesis with regard to anatomical relationships to orthosis and/or prosthesis (e.g., trimlines, static/dynamic alignment) to determine need for changes relative to initial treatment goals	2.7	2.9
Evaluate orthosis and/or prosthesis for structural changes	3.7	3.4
Modify/adjust orthosis and/or prosthesis, as necessary, to maintain optimal function	3.6	3.3
Repair orthosis and/or prosthesis, as necessary	4.2	3.6
Document modifications/adjustments/repairs	3.6	3.3
Develop and document long-term service plan	2.2	2.6

Domain 5: Practice Management		
Adhere to applicable local, state and federal laws and regulations (e.g., OSHA, FDA)	4.5	3.6
Follow patient care guidelines and procedures (e.g., ABC's Code of Professional Responsibility, quality control program)	4.5	3.7
Maintain a safe and professional environment (e.g., ABC Facility Accreditation)	4.7	3.7
Adhere to manufacturer's conditions of use and/or specifications	4.7	3.8
Perform scheduled machine maintenance and calibration	4.0	3.5
Document service of machines and equipment (e.g., maintenance logs)	3.4	3.2
Domain 6: Promotion of Competency and Enhancement of Professional Practice		
Participate in continuing education	3.4	3.5
Participate in the education of residents and students	3.2	3.2
Participate in product development research, clinical trials, and/or outcome evaluation studies	2.6	2.9
Promote public awareness of the profession	3.0	3.1

1=Never, 2=Rarely (quarterly), 3=Occasionally (monthly), 4 =Frequently (weekly), or 5=Very frequently (daily)

In summary, the overall pattern of the *Frequency* and *Criticality* ratings on these 45 tasks indicates that the practice analysis delineation included critical tasks performed by technicians in both disciplines. The pattern of *Frequency* and *Criticality* ratings validates the use of these tasks in initiatives related to item writing and examination development.

Knowledge and Skill Statement Ratings

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

- *Criticality*: How critical is this knowledge or skill to optimizing outcomes for patients, caregivers and healthcare providers?
- *Frequency*: How frequently did you use the knowledge or skill during the past year?

Table 20 documents the mean of the *Frequency* and *Criticality* ratings for the knowledge statements for the total sample of technicians responding to the survey. The *Frequency* ratings for 29 of 36 statements indicate that these knowledge areas are called upon occasionally (monthly) to frequently. The ratings for the remaining statements indicate that those bodies of knowledge or skill are called upon rarely (quarterly). As can be seen, 30 of the 36 knowledge statements were rated between moderately and highly critical to optimizing outcomes for patients, caregivers and/or healthcare providers. The *Criticality* ratings of a majority of the remaining statements approached moderately critical.

**Table 20:
Knowledge Statements Frequency and Criticality Ratings**

	Frequency Mean	Criticality Mean
Orthotic/prosthetic design (e.g., trimlines)	4.7	3.7
Orthotic/prosthetic fitting criteria	3.8	3.4
Impression-taking techniques, materials, devices and equipment	3.1	3.0
Rectification/modification procedures as they relate to specific orthotic/prosthetic designs	3.6	3.3
Measurement tools and techniques	4.3	3.6
Alignment devices and techniques	4.4	3.7
Orthotic/prosthetic forms (e.g., assessment, orthometry, measurement, evaluation, outcomes)	4.1	3.5
Materials science	4.1	3.4
Componentry	4.6	3.7
Hand and power tools	4.8	3.7
Mechanics (e.g., levers and force systems)	4.2	3.4
Care and maintenance of orthoses/prostheses	4.2	3.4
Item warranty and warranty limitations	3.3	2.9
Loss control (e.g., risk management, inventory control)	3.7	3.1
Musculoskeletal anatomy, including upper limb, lower limb, spinal	3.9	3.5
Anatomical landmarks (surface anatomy)	4.4	3.7
Normal human locomotion	3.8	3.4
Gait training	2.8	3.0

Pathological gait	2.6	2.9
Tissue characteristics/management	2.8	3.0
Volumetric control	2.8	2.9
Planes of motion	3.4	3.1
Biomechanics	3.3	3.1
Pathologies (e.g., muscular, neurologic, skeletal, vascular)	3.0	3.0
Medical terminology	4.0	3.4
Referral documents	2.7	2.6
Procedures to record data	3.4	3.0
Policies and procedures regarding privileged information	3.7	3.3
Material safety procedures and standards (e.g., OSHA, MSDS)	4.2	3.6
Universal precautions, including sterile techniques and infection control	3.8	3.5
Ethical standards regarding proper patient management (e.g., ABC Code of Professional Responsibility)	3.7	3.3
Scope of practice related to orthotic/prosthetic credentials	3.5	3.2
Boundaries of the scope of practice (i.e., when to refer a patient to other healthcare providers/caregivers)	2.7	2.8
Patient educational materials	2.8	2.9
Federal and state rules, regulations, and guidelines (e.g., FDA, ADA, HIPAA)	3.6	3.3
ABC Facility Accreditation Standards	3.6	3.2

Frequency rating scale:

1=Never, 2=Rarely (quarterly), 3=Occasionally (monthly), 4=Frequently (weekly), 5=Very frequently (daily)

Criticality rating scale:

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

Table 21 documents the mean of the *Frequency* and *Criticality* ratings for the 18 skill statements. A careful review of the table indicates wide variability in these *Frequency* ratings; for example, ratings for seven statements indicate that these seven skills are performed frequently to very frequently. The ratings of the most frequently performed skills were very consistent—indicating that these skills represent areas that are most universal to the daily work of technicians. Fourteen of the 18 skill statements were rated as moderately to highly critical to optimizing outcomes for patients, caregivers and healthcare providers. The *Criticality* ratings of four of the remaining skills approach a moderately critical level.

**Table 21:
Skill Statements Frequency and Criticality Ratings**

	Frequency Mean	Criticality Mean
Interpreting referral documents, (e.g., prescriptions, orders)	2.9	2.8
Communicating with patient/family/caregiver	2.9	2.9
Identifying gross surface anatomy	2.7	2.8
Analyzing orthotic/prosthetic gait/motion	2.6	2.8
Using mechanical measuring devices	3.8	3.4
Modifying patient models	3.5	3.4
Delineating a tracing	3.1	3.3
Fabricating orthosis/prosthesis	4.8	3.9
Using safety equipment	4.8	3.7
Using hand and power tools	4.9	3.8
Using materials and components	4.9	3.8
Using alignment devices	4.6	3.7
Completing aesthetic finishing	4.6	3.7
Evaluating fit and function of an orthosis/prosthesis	3.2	3.1
Adjusting and modifying orthoses/prostheses	3.8	3.4
Maintaining and repairing orthoses/prostheses	4.3	3.7
Restoring optimal fit and function of orthoses/prostheses	3.7	3.4
Documenting	3.8	3.3

Frequency rating scale:

1=Never, 2=Rarely (quarterly), 3=Occasionally (monthly), 4=Frequently (weekly), 5=Very frequently (daily)

Criticality rating scale:

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

Orthotic Practice Areas, Devices and Activities

The survey next asked respondents to answer a series of questions from the perspective of either an orthotic or a prosthetic technician. Those completing the orthotic technician version were asked the percentage of their time performing tasks associated with each orthotic practice area and to provide detailed percentages for specific devices on which they spent their work time. Lower Extremity comprises the majority of total orthotic work time, with an average of 73% of work time. Within that area, the four AFO devices make up the greatest part, comprising a total of almost one-third of work time (32%). KAFO devices were next most frequently the focus of work, with three KAFO devices taking up almost 12% of work time. On average, approximately 12% of work time is devoted to devices in the Spinal area, followed by Upper Extremity area and devices (7% of work time) and Scoliosis area and devices (6% of time). Work in Other practice areas takes less than 3% of work time.

Table 22:
Percent of Time in Orthotic Practice Areas and Devices

Lower Extremity	71.3%
Custom shoes	1.8%
Shoe modifications	5.4%
FO	9.4%
SMO (supra malleolar orthosis)	4.2%
AFO (leather gauntlet)	2.0%
AFO (metal)	5.0%
AFO (plastic)	23.4%
AFO (composite)	1.5%
KO	3.2%
KAFO (metal)	3.4%
KAFO (plastic)	6.6%
KAFO (composite)	1.8%
HO	0.9%
HKAFO	1.7%
Other	1.0%
Spinal	12.4%
LSO (flexible)	1.2%
LSO (metal)	0.2%
LSO (thermoplastic)	2.0%
TLSO (flexible)	1.2%
TLSO (metal)	0.2%

TLSO (thermoplastic)	6.4%
CTO	0.3%
CO	0.3%
Other	0.6%
Scoliosis	5.9%
TLSO	4.8%
CTLSO (Milwaukee)	0.5%
Other	0.5%
Upper Extremity	7.4%
HO	0.8%
WHO	3.5%
EWHO	1.3%
EO	1.6%
Other	0.3%
Other	2.9%
Dynamic contracture orthosis	0.8%
Stance control orthosis KAFO	0.6%
Protective face mask	0.1%
Cranial molding orthosis	0.8%
Other	0.5%

Respondents were asked which of six specific tasks they performed independently (without supervision) with respect to the devices in each of the orthotic practice areas. The average percentage of respondents who perform each activity in the overall practice are presented in Table 23, below. Regardless of registration status or practice area, respondents are most likely to perform fabrication-related activities.

**Table 23:
Percent of Respondents Performing Orthotic Activities**

	Perform initial patient evaluation	Measure mold/digitize/scan patient	Modify patient model/delineation	Fabricate	Fit patient	Perform follow-up/evaluation/adjustment
Lower Extremity	19%	24%	54%	86%	25%	38%
Spinal	27%	29%	40%	72%	30%	47%
Scoliosis	17%	21%	39%	80%	16%	34%
Upper Extremity	21%	23%	54%	91%	24%	36%
Other	15%	17%	44%	87%	16%	31%

**Table 24:
Orthotic Devices and Activities Performed
Average Percent of Respondents Performing Activities**

	Perform initial patient evaluation	Measure/ mold/ digitize/ scan patient	Modify patient model/ delineation	Fabricate	Fit patient	Perform follow-up/ evaluation/ adjustment
Lower Extremity						
Custom shoes	32%	39%	39%	46%	37%	66%
Shoe modifications	20%	22%	40%	86%	25%	38%
FO	17%	23%	61%	95%	24%	35%
SMO (supra malleolar orthosis)	12%	16%	57%	95%	20%	31%
AFO (leather gauntlet)	21%	26%	55%	79%	26%	41%
AFO (metal)	18%	28%	68%	92%	24%	40%
AFO (plastic)	16%	24%	63%	94%	24%	35%
AFO (composite)	21%	22%	48%	79%	28%	41%
KO	20%	23%	48%	84%	25%	37%
KAFO (metal)	17%	25%	58%	91%	21%	33%
KAFO (plastic)	16%	22%	60%	92%	22%	33%
KAFO (composite)	23%	23%	58%	87%	23%	36%
HO	18%	20%	52%	91%	27%	32%
HKAFO	13%	20%	42%	92%	17%	28%
Spinal						
LSO (flexible)	33%	36%	35%	62%	38%	55%
LSO (metal)	24%	24%	44%	74%	29%	44%
LSO (thermoplastic)	21%	25%	41%	79%	26%	40%
TLSO (flexible)	29%	31%	38%	67%	29%	48%
TLSO (metal)	27%	30%	42%	70%	30%	48%
TLSO (thermoplastic)	22%	24%	45%	78%	24%	36%
CTO	29%	32%	45%	76%	32%	50%
CO	31%	33%	33%	69%	33%	51%
Scoliosis						
TLSO	16%	20%	39%	81%	17%	30%
CTLTO (Milwaukee)	18%	21%	38%	79%	15%	38%
Upper Extremity						
HO	22%	24%	58%	91%	27%	38%
WHO	21%	23%	56%	91%	23%	35%
EWHO	19%	22%	52%	89%	22%	37%
EO	22%	24%	51%	91%	25%	35%
Other						
Dynamic contracture orthosis	19%	21%	43%	81%	19%	33%
Stance control orthosis KAFO	17%	15%	51%	85%	15%	34%
Protective face mask	12%	15%	44%	93%	15%	29%
Cranial molding orthosis	12%	18%	38%	88%	15%	26%

Prosthetic Practice Areas, Devices and Activities

Respondents answering from the perspective of prosthetic technicians were asked the percentage of time they spent performing tasks associated with each prosthetic practice area. They were also asked for detailed percentage of time distributions for the practice areas in which they worked. The majority of prosthetic technician work time is spent in the Transtibial area, with 42% of work time on average spent in this area. This is followed by the Transfemoral area (26%). Symes-related work comprises nearly 7% of time, and Partial foot and Knee disarticulation both take about 5% of time. All other areas comprise less than 5% of work time. Details of the practice areas and the time spent on various devices are presented in Table 25.

Table 25:
Percent of Time in Prosthetic Practice Areas and Devices

	Mean %
Partial foot	4.9%
Silicone	1.1%
Leather	0.7%
Composite	1.6%
Thermoplastic	1.5%
Symes	6.5%
Expandable wall	0.7%
Removable window	3.3%
Molded insert	2.5%
Transtibial	42.3%
Construction	
Exoskeletal	7.0%
Endoskeletal	35.3%
Material	
Thermoplastic	6.0%
Laminated	22.7%
Combination (flexible inner socket, rigid frame)	13.6%
Knee disarticulation	4.9%
Transfemoral	25.9%
Construction	
Exoskeletal	3.1%
Endoskeletal	22.8%
Material	
Thermoplastic	2.7%
Laminated	8.9%
Combination (flexible inner socket, rigid frame)	14.3%
Hip disarticulation	2.3%

Partial hand	1.1%
Wrist disarticulation	1.7%
Transradial	4.8%
Myoelectric	1.3%
Body-powered	3.5%
Elbow disarticulation	1.3%
Transhumeral	3.2%
Myoelectric	0.6%
Body-powered	2.4%
Hybrid (body-powered elbow, myoelectric hand)	0.3%
Shoulder disarticulation	1.1%

Prosthetic technicians were asked to indicate the specific activities they perform independently (without supervision) in each practice area. (Table 26.)

Table 26
Prosthetic Devices and Activities Performed
Average Percent of Respondents Performing Activities

	Perform initial patient evaluation	Measure/ mold/ digitize/ scan patient	Modify patient model/ delineation	Fabricate	Fit patient	Perform follow-up/ evaluation/ adjustment
Partial foot	10%	18%	43%	95%	22%	30%
Symes	9%	12%	27%	97%	16%	24%
Transtibial	13%	17%	37%	97%	21%	31%
Knee disarticulation	10%	11%	25%	96%	17%	25%
Transfemoral	11%	13%	29%	97%	18%	28%
Hip disarticulation	8%	9%	22%	96%	13%	22%
Partial hand	12%	12%	24%	96%	18%	19%
Wrist disarticulation	14%	10%	27%	94%	18%	24%
Transradial	11%	10%	29%	94%	18%	26%
Elbow disarticulation	10%	10%	20%	94%	17%	23%
Transhumeral	12%	11%	26%	94%	18%	26%
Shoulder disarticulation	12%	11%	20%	95%	15%	21%

Section Three

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

- More than half of respondents (57%) answered from the perspective of a prosthetics technician, and 43% answered from the perspective of an orthotics technician.
- Respondents had an average of 14.5 years of technician experience, with RTs having slightly more experience than non-registered technicians (16.5 years versus 12.1 years, respectively).
- Almost one third of respondents' primary work settings were in a publicly owned multi-facility orthotics or prosthetics practice, while almost 20% were in a hospital-based practice. Nearly 16% were in a privately owned single practice and about 11% were in a privately owned multi-facility practice.
- More than 80% of respondents were employees of a single or multi-facility practice; about 6% were practice owners; and another 6% were employees of a central fabrication company.
- Almost 81% of respondents worked in a facility with 1-5 other technicians, and an additional 13% worked in a facility with 6-10 other technicians. Seventy percent worked in a facility with 1-5 practitioners, and an additional 21% worked with 6-10 practitioners.
- The most frequent educational level of respondents was high school/GED with O/P certificate (35%), followed by high school/GED alone (17%), then an associates' degree (12%), a bachelor's degree (11%) and high school/GED and O/P short-term courses (9%).
- Respondents came from 42 different jurisdictions, and were predominantly Caucasian/white (86%) and male (91%).

Highlights Related to Domains, Tasks, Knowledge and Skill Statements

- Technicians indicated that they spend the most time performing tasks associated with *Implementation of Orthotic/Prosthetic Requirements* (49% and 51%, respectively). The remaining five domains take up almost equal amounts of time, ranging from 7% to 12%.
- The domains *Formulation of Orthotic/Prosthetic Requirements* and *Promotion of Competency and Enhancement of Professional Practice* are rated as at least moderately critical (3.0). For three domains criticality ranges between minimally and moderately critical (2.6 for *Practice Management*, 2.8 for both *Assessment*, and *Follow-up Plan*). It therefore appears that the domains involving the tasks associated with traditional technician responsibilities as well as to the promotion of professionalism are seen as most critical to optimizing outcomes for patients.

- Of respondents answering from the orthotic perspective, two thirds (66%) of time is spent in orthotic fabrication, 9% in prosthetic fabrication and 12% doing some type of clinical patient care (either with supervision or unsupervised).
- Of respondents answering from the prosthetic perspective, slightly less than two thirds of time (62%) is spent in prosthetics fabrication, 16% of time is spent in orthotic fabrication and 13% of time is spent doing some type of clinical patient care (either with supervision or unsupervised).
- Task frequency ratings range from a low of 1.7 (never to rarely performed) for *Ensure that responsible parties are informed of their financial responsibilities* to a high of 4.7 (frequently to very frequently performed) for four tasks: *Fabricate/assemble an orthosis and/or prosthesis to prepare for initial or diagnostic fitting and/or delivery*; *Complete fabrication process after achieving optimal fit and function of orthosis and/or prosthesis (e.g., convert test socket to definitive orthosis and/or prosthesis)*; *Maintain a safe and professional environment (e.g., ABC Facility Accreditation)*; and *Adhere to manufacturer's conditions of use and/or specifications*.
- Criticality ratings are likewise lowest for *Ensure that responsible parties are informed of their financial responsibilities* (2.0, minimally critical) but are at least 2.6 (minimally to moderately critical) for all other tasks.
- All knowledge statements were rated as being performed at least quarterly to monthly. Thirty of the 36 knowledge statements were rated as at least moderately to highly critical, with the remainder being rated as approaching moderately critical.
- The frequency with which skills are used ranged from highs of 4.9 (almost daily) for *Using hand and power tools* and *Using materials and components* to a low of 2.6 (quarterly) for *Analyzing orthotic/prosthetic gait/motion*.
- In summary, the overall pattern of the *Frequency* and *Criticality* ratings on the tasks, knowledge and skills indicates that the practice analysis delineation included the critical components used by orthotic and prosthetic technicians in practice. The pattern of *Frequency* and *Criticality* ratings validates the use of these tasks in initiatives related to examination development.

Highlights Related to Orthotic and Prosthetic Practice Areas and Devices

- Technicians working in the orthotic profession spend the majority of their work time (71%) working in the Lower Extremity practice area. The majority of this time is spent with AFO devices. The Spinal area consumes the next largest percent of time (12%) followed by Upper Extremity (7%) and Scoliosis (6%).
- Orthotic technicians performed the six activities at different rates depending on the practice area. Overall, *Fabricate* was performed most frequently (ranging from 72% to 91% of respondents, depending on practice area), followed by *Modify patient model/delineation* (from 39% to 54% of respondents).
- As described in the qualitative comments, technicians are performing activities that involve direct patient care. A range of 31% to 47% of orthotic technicians indicated that

they *Perform follow-up/evaluation/adjustment*, depending on practice area; from, 15% to 27% of respondents said they *Perform initial patient evaluation* in the different practice areas; from 17% to 29% of respondents indicated that they *Measure/mold/digitize/scan patient*; and from 16% to 30% responded that they *Fit patient*. It is unclear whether they are performing these tasks independently or are assisting the practitioner.

- Technicians working in the prosthetic profession spend the majority of their work time (42%) in the Transtibial area, followed by Transfemoral (26%), Symes (about 7%), and Partial foot and Knee disarticulation (both about 5%). No other prosthetic practice area required more than 5% of technician work time.
- Prosthetic technicians performed the six activities at different rates depending on the practice area. Overall, *Fabricate* was performed most frequently (from 94% to 97% of respondents), followed by *Modify patient model/delineation* (from 20% to 43% of respondents).
- Prosthetic technicians also performed the activities involving direct patient care in the different practice areas. From 19% to 31% of prosthetic technicians indicate they *Perform follow-up/evaluation/adjustment*, depending on practice area; from 9% to 14% said they *Perform initial patient evaluation* in the various prosthetic practice areas; from 9% to 18% of respondents indicated that they *Measure/mold/digitize/scan patient*; and from 13% to 22% responded that they *Fit patient*. It is unclear whether they are performing these tasks independently or are assisting the practitioner.