



# Understanding Job Classifications in Dental Laboratory Settings

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## Abstract

In recent years, the dental laboratory industry experienced significant transformation initiated by new digital platforms and business models. Consequently, the dental laboratory workforce is required to be more knowledgeable, conversant, and experienced in fundamentals, latest materials, equipment, and techniques, as well as in the new healthcare and business models to fulfill growing needs of operating a compliant and successful dental laboratory. Yet, according to the Bureau of Labor Statistics (BLS) and Occupational Information Network (O\*NET), the minimum entry requirement for this highly skilled profession remains a high school diploma or its equivalent. This research examines the background, scope and relationship of Bureau of Labor Statistics (BLS) and Dictionary of Occupational Titles (DOT) & O\*NET classifications to the dental laboratory technology profession including the evolution of job categories, as well as the advantages, disadvantages, and consequences of altering job classifications.

## 1971 DLT Classification

In 1971 a document (known as the *Position Classification Standard for Dental Laboratory Aid and Technician Series, GS-0683*) issued by the U.S. Office of Personnel Management, developed to facilitate federal pay scale, included dental laboratory technology occupational classification comprised of the supervisory and nonsupervisory positions involving *technical work in the fabrication and repair of dental prosthetic appliances based on prescription from a dentist, and required technical knowledge of dental anatomy and skill in the use of dental laboratory materials and equipment.* The basis for this classification were the nature of the assignment (including the duties, knowledge and skills) and the level of responsibility. This classification resulted in three categories of Dental Technology Aid and six categories of Dental Laboratory Technician as follows<sup>1</sup>

- DENTAL LABORATORY AID, GS-0683-01 no previous experience; specific supervision, guidance and instruction in all phases of assigned tasks
- DENTAL LABORATORY AID, GS-0683-02 basic knowledge of laboratory equipment and materials; works under the supervision
- DENTAL LABORATORY AID, GS-0683-03 intensive training in selected methods, procedures, and techniques, works under close supervision
- DENTAL LABORATORY TECHNICIAN, GS-0683-04 expected to carry out routine, standardized tasks with a minimum supervision
- DENTAL LABORATORY TECHNICIAN, GS-0683-05 additional knowledge and added technical complexity of the procedures and techniques employed required, training and instruction in methods, procedures, and techniques; the supervisor explains assignments in detail
- DENTAL LABORATORY TECHNICIAN, GS-0683-06 specific training and instruction, and receives training in methods and techniques that are typical of the next higher-grade level; carries assignments under general supervision; assignments explained in detail
- DENTAL LABORATORY TECHNICIAN, GS-0683-07 independently performs the full range of functions required to construct fixed or removable partial dentures or complete dentures for cases that do not involve acute abnormalities of the mouth; includes chairside instruction as the dentist points out and explains the anatomical and functional requirements of the appliance to be constructed
- DENTAL LABORATORY TECHNICIAN, GS-0683-08 thorough technical knowledge of both normal and abnormal oral anatomy and dentition as these affect the design, fabrication, function, and esthetics of the dental prosthesis being constructed; supervisor is available for consultation, dental laboratory technician is expected to resolve the majority of problems independently
- DENTAL LABORATORY TECHNICIAN, GS-683-09 developed and demonstrated a degree of expertness in all aspects of the work that results in consultation with the dentists regarding difficult design and construction problems, and the dentist's acceptance of the value and validity of their suggestions and recommendations; assigned unusually novel and intricate dental prostheses, and relied upon to carry out all aspects of their fabrication independently; work under the supervision of oral surgeons, prosthodontists, or other dentists who make work assignments and discuss the requirements of the case, but who rely on the dental laboratory technician to be ingenious and creative in resolving the difficult design and construction problems; technical advice is sought and given weight in planning and carrying out clinical or surgical procedures

## BLS Background

In the United States, the government entity overseeing occupational classifications is the Bureau of Labor Statistics (BLS):

- The agency was created in 1884 when Congress founded a Bureau of Labor in the Department of Interior,
- Few years later the name was changed to the Bureau of Labor Statistics (BLS)
- In 1888, BLS became an independent department and continued for 15 years
- In 1903 BLS was incorporated into the Department of Commerce and Labor
- In 1913, BLS was reassigned to Department of Labor (DOL) where it remains to this day.<sup>8</sup>

## Historical Perspective of Job Classifications

BLS developed Standard Occupational Classification (SOC)

- The earlier SOC emphasized the industry in which one worked
- SOC revisions:
  - 1850 - Census of Population established the first classification of 322 occupations and included dentists, lawyers, carpenters, and others
  - 1942 - more frequent data collection began with the monthly workforce survey when the U.S. Employment Service needed occupational statistics and developed a Convertibility List of Occupations with Conversion Tables
  - 1965 - revisions to the census classification and publication of the third edition of the Department of Labor's Dictionary of Occupational Titles encouraged the government to begin a comprehensive reexamination of occupational classification
  - 1977 SOC - the very first SOC system was created to link different systems and to include all occupations for which work was performed for pay or profit
  - 1980 SOC - revised and reissued<sup>14</sup>, not universally adopted and many agencies continued collecting occupational data using classification systems that differed from the SOC
  - 1993 - BLS held an international conference to revise the SOC
  - 1994 - Standard Occupational Classification Revision Policy Committee (SOCPC) was established to spearhead the revisions that would meet the needs of the 21st century<sup>13,14</sup>
  - 1998 SOC - two-volume manual including over 30,000 job titles commonly used by individuals and establishments.<sup>15</sup>
  - 2000 SOC - revisions of 1998 SOC and the original 1977 SOC
  - 2010 SOC - retained the 2000 SOC structure, its major and minor changes increased clarity, corrected errors, and accounted for significant updates in technology, healthcare, human resource occupations, and in the nature and organization of work in the U.S. economy. Overall, the four types of revisions that took place were changes in editing (grammatical edits, improvements to definitions, descriptions of performed work), content (addition or deletion of occupational titles), titles, and codes (related to the analysis of the types of skills needed to perform the work).<sup>13</sup>
  - 2018 SOC - used by over 16 federal agencies and 100 other federal programs to classify workers into occupational categories to collect, calculate, and disseminate data.<sup>16</sup>
  - The more recent SOC shifted the focus to the characteristics of the work performed
  - Revising the SOC is a multi-year process. Each of 2010 and 2018 revisions took about 5 years to complete.
  - Over the 43 years since the SOC was first introduced, it has remained a four-level hierarchy with the number of major occupation groups increasing from 21 in 1977 SOC to 23 in 2010 and 2018 SOC, and the number of detailed occupations growing from 662 in 1977 SOC, to 840 in 2010 SOC, to 867 in 2018 SOC.<sup>16, 18</sup>

## SOC Revision and Implementation

- First Federal Register notice
- SOCP reviews public input, federal agency input, and conducts its research to develop recommendations for OMB
- Second Federal Register notice requests public comments on SOCP recommendations
- Final recommendations sent to OMB
- Third Federal Register notice announces the final SOC structure, occupation codes, and titles to be implemented by the Federal statistical agencies
- Reference date reflects the full implementation of the SOC data.<sup>16</sup>

## Current BLS

- employs about 2,500 economists, statisticians, data scientists, information technology specialists, researchers, administrative specialists, and many other professionals
- maintains partnerships with state and territorial governments, coordinates with other federal statistical agencies, and contract with private vendors for data collection, information technology, and related services.<sup>9</sup>
- At its helm is the Commissioner who is nominated by the President, confirmed by the Senate, and serves a 4-year fixed term.<sup>10</sup>
- The national office is located in Washington, DC and eight regional information offices are spread across New England, New York-New Jersey, Mid-Atlantic, Southeast, Midwest, Mountain-Plains, and Western regions of the country.<sup>11</sup>
- BLS provides statistical guidance and support for the data needs to the Department of Labor and its agencies
- It follows the DOL's mission *"To foster, promote, and develop the welfare of the wage earners, job seekers, and retirees of the United States; improve working conditions; advance opportunities for profitable employment; and assure work-related benefits and rights."*
- To aid in the public and private decision making, BLS measures labor market activity, working conditions, price changes, and productivity in the U.S. economy.
- To ensure that presented data and analyses are objective and free of biased influence, BLS conducts its work independently and with confidentiality in mind.<sup>9</sup>
- Today, all federal agencies that publish occupational data for statistical purposes are required to use the BLS' Standard Occupational Classification (SOC), and State and local government agencies are strongly encouraged to use this national system to promote a common language for categorizing and analyzing occupations.<sup>12</sup>

### About the O\*NET-SOC 2019 Taxonomy

The O\*NET-SOC 2019 taxonomy structure has been revised based on the transition to the 2018 SOC. The new O\*NET-SOC taxonomy includes 1,016 occupational titles, 923 of which represent O\*NET data-level occupations.

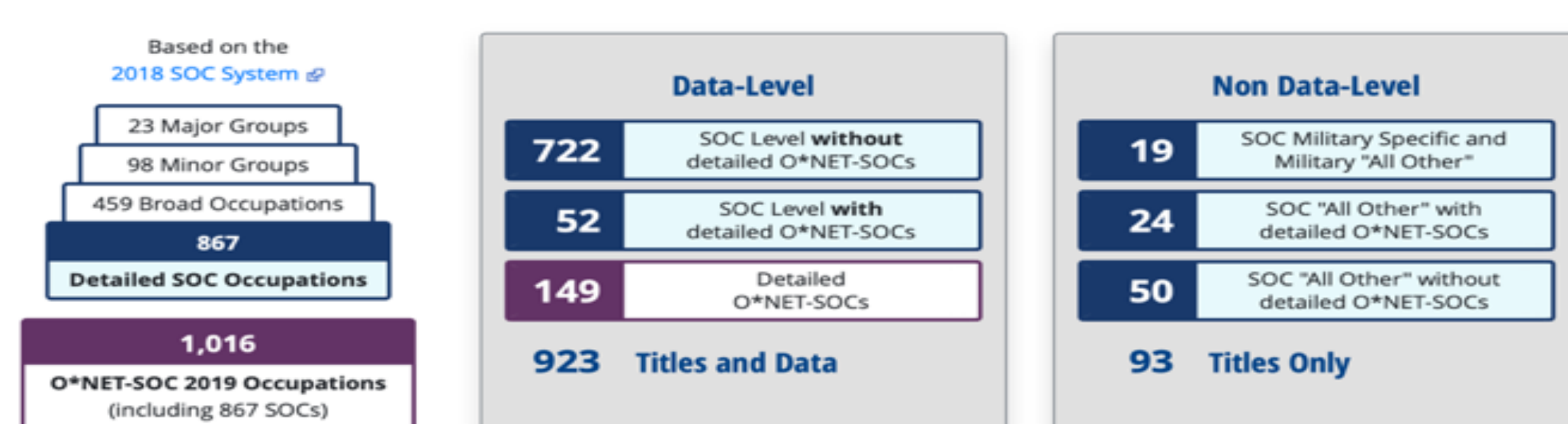


Figure 1 2019 O\*NET Taxonomy<sup>26</sup>

## DLT Occupation Classification Changes

Figure 2 DOT SVP Levels<sup>28</sup>

DOT SVP Levels	
SVP 1	Short demonstration only
SVP 2	Anything beyond short demonstration up to and including 1 month
SVP 3	Over 1 month up to and including 3 months
SVP 4	Over 3 months up to and including 6 months
SVP 5	Over 6 months up to and including 1 year
SVP 6	Over 1 year up to and including 2 years
<b>SVP 7</b>	<b>Over 2 years up to and including 4 years</b>
SVP 8	Over 4 years up to and including 10 years
SVP 9	Over 10 years

Figure 3 O\*NET Job Zones & SVP Levels<sup>29</sup>

O*NET Job Zones	
Job Zone 1 = SVP below 4.0	occupations that need little or no preparation
<b>Job Zone 2 = SVP 4.0 &lt; 6.0</b>	<b>occupations that need some preparation</b>
Job Zone 3 = SVP 6.0 < 7.0	occupations that need medium preparation
Job Zone 4 = SVP 7.0 < 7.9	occupations that need considerable preparation
Job Zone 5 = SVP 8.0 and higher	occupations that need extensive preparation

What followed was advocacy for reclassification for dental laboratory technician occupation to at least Job Zone 3. (Figure 4, 5)

Figure 4 O\*NET Job Zone Two<sup>31</sup>

O*NET Job Zone Two: Some Preparation Needed	
• Education:	These occupations usually require a high school diploma.
• Related Experience:	Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.
• Job Training:	Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.
• Job Zone Examples:	These occupations often involve using your knowledge and skills to help others. Examples include orderlies, counter and rental clerks, customer service representatives, security guards, upholsterers, and tellers.
• SVP Range:	(4.0 to < 6.0)

Figure 5 O\*NET Job Zone Three<sup>32</sup>

O*NET Job Zone Three: Medium Preparation Needed	
• Education:	Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.
• Related Experience:	Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.
• Job Training:	Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.
• Job Zone Examples:	These occupations usually involve using communication and organizational skills to coordinate, supervise, manage, or train others to accomplish goals. Examples include hydroelectric production managers, travel guides, electricians, agricultural technicians, barbers, court reporters, and medical assistants.
• SVP Range:	(6.0 to < 7.0)

## Occupational Classification and DLT Profession

- 2000 SOC, 2010 SOC, and 2018 SOC classification revisions brought no significant dental laboratory technician occupation changes. The Major Group for DLT occupation in all three classifications remained 51-0000 *Production Occupations, Minor Group is 51-9000 - Other Production Occupations, Broad Occupation is 51-9080 - Dental and Ophthalmic Laboratory Technicians and Medical Appliance Technicians, and Detailed Occupation is 51-9081 - Dental Laboratory Technicians.*
- Current OOH defines the occupation as *"Dental laboratory technicians use traditional or digital impressions or molds of a patient's teeth to create crowns, bridges, dentures, and other dental appliances. They work closely with dentists but have limited contact with patients. Dental laboratory technicians work with small hand tools, such as files and polishers. They work with many different materials, including wax, alloy, ceramic, plastic, and porcelain, to make prosthetic appliances. In some cases, technicians use computer programs or three-dimensional printers to create appliances or to get impressions sent from a dentist's office. Dental laboratory technicians can specialize in one or more of the following: orthodontic appliances, crowns and bridges, complete dentures, partial dentures, implants, or ceramics. Technicians may have different job titles, depending on their specialty. For example, technicians who make ceramic restorations such as veneers and bridges, are called dental ceramists."* According to OOH, dental laboratory technicians held close to 36,500 jobs in 2018 earning a median annual wage of \$40,440.00. Because of demands from an aging population, employment growth for 2018 to 2028 was projected at 11% or increase of 3,900 jobs which is much faster than the average for all occupations or as comparable to 7 percent growth for dentist occupation listed as first similar occupation. Technicians who have earned professional certification and are familiar with high tech skills, such as three-dimensional printing, are likely to have the best job prospects. More information about what dental technicians do, work environment, how to become one, pay, job outlook, data by state and area, similar occupations and more information can be found on BLS' website at [www.bls.gov](http://www.bls.gov) under *"Dental and Ophthalmic Laboratory Technicians and Medical Appliance Technicians"*.<sup>32</sup>
- O\*NET replicates BLS' SOC in defining dental laboratory technician occupation as "51-9081.00 Dental Laboratory Technicians - Construct and repair full or partial dentures or dental appliances" in Job Zone 2 described earlier.<sup>33</sup> Today, O\*NET lists 43% of DLT respondents having a high school diploma or equivalent, and 39% have post-secondary certificate or associate degree. Technology is frequently required in job postings for Dental Laboratory Technicians. Similarly, to OOH, O\*NET lists 2018 median hourly wage at \$19.44, and annual wage at \$40,440.00 with much faster than average projected growth at 11% and 5,100 job openings for 2018-2028. According to O\*NET respondents, Dental Laboratory Technicians are employed at 76% in manufacturing, 17% in health care and social assistance and 7% in other industries.<sup>34</sup>
- Unfortunately, the dental laboratory technology profession became a casualty the federal classifications' revisions changes. The validity and reliability of O\*NET classification while praised by some, yet seriously questioned by others.
- It was BLS's SOC Job Zone 2 and O\*NET's SVP 4.0<6.0 downgrade that harmed the dental laboratory technology community. The consequences of such actions can be seen today in the sizable shortages of qualified dental technicians to fulfill the needs of the current market, and lower enrollment in the dental technology programs causing program closure on a startling scale. The effects of occupational classification downgrades and lack of required formal education as entry to the profession are catching up with the entire profession.

## DLT Education

In 1970s there were about 60 CODA-accredited formal education DLT programs, a decade ago about 20, and today only 14 programs remain.<sup>35, 36</sup> Of the 14 programs admitting 319 and graduating 211 students in 2018-2019, there was only one program offering a bachelor's degree in dental technology. When comparing to 327 Dental Hygiene college-level programs enrolling 8,288 and graduating 7,377 students, or 66 dental schools with an applicant pool of 11,298, enrolling 6,250 and graduating 6,305 in 2018, the DLT formal education is disappearing. DLT education is coming to a halt when BLS predicts 11% job growth between 2018-2028 bringing an even higher demand for knowledgeable dental technicians.<sup>35, 37</sup>

## Dental Laboratory Technician Occupational Classifications Proposals

Figure 7 Proposed reclassification of Dental Laboratory Technicians (51-9081) within SOC structure<sup>43</sup>

Removal of Dental Laboratory Technician occupation from the current SOC Classification:	Placement of Dental Laboratory Technician occupation in the proposed Major and Minor Groups and modification to create a new Broad Occupation and two Detailed Occupations given actual work performed, highest level of skill, and supervisory structure, recommended and preferred classification and coding:
<ul style="list-style-type: none"> <li>• Major Group: Production Occupations (51-0000)</li> <li>• Minor Group: Other Production Occupations (51-9000)</li> <li>• Broad Occupation: Medical, Dental, and Ophthalmic Laboratory Technicians (51-9080)</li> <li>• Detailed Occupation: Dental Laboratory Technicians (51-9081)</li> </ul>	<ul style="list-style-type: none"> <li>• Major Group: Healthcare Practitioners and Technical Occupations (29-0000)</li> <li>• Minor Group: Health Technologists and Technicians (29-2000)</li> <li>• Proposed Broad Occupation: RESTORATIVE DENTAL TECHNOLOGISTS AND TECHNICIANS (29-20 )</li> <li>• Proposed Detailed Occupation:               <ol style="list-style-type: none"> <li>1. RESTORATIVE DENTAL TECHNOLOGISTS (29-20 )</li> <li>2. DENTAL TECHNICIANS (29-20 )</li> </ol> </li> </ul> <p>Another possible and suitable placement if the above was not accepted would be:</p> <ul style="list-style-type: none"> <li>• Major Group: Healthcare Practitioners and Technical Occupations (29-0000)</li> <li>• Minor Group: Health Technologists and Technicians (29-2000)</li> <li>• Broad Occupation: MISCELLANEOUS HEALTH TECHNOLOGISTS AND TECHNICIANS (29-2090):               <ul style="list-style-type: none"> <li>• Detailed Occupation:                   <ol style="list-style-type: none"> <li>1. Orthotists and Prosthetists (29-2091)</li> <li>2. Hearing Aid Specialists (29-2092)</li> <li>3. Health Technologists and Technicians, All Other (29-2099)</li> <li>4. RESTORATIVE DENTAL TECHNOLOGISTS AND DENTAL TECHNICIANS (29-20 )</li> </ol> </li> </ul> </li> </ul>

## Conclusions

High demand exists to attract young entrepreneurs, researchers, technical and regulatory experts, and talented individuals who will find this profession attractive to enter. With emerging regulations, liabilities, innovations in materials, equipment and techniques that are exerted on dental laboratories, the profession can no longer tolerate the minimum requirement of high school diploma or on-the-job training. To elevate the future of the profession, dental technicians must have a voice and promote their worth, embrace the accountability for completed work, urge state dental associations to influence state dental practice acts as well as include dental laboratory technology associations to promote legislation to raise the standards for the entire profession. With changing industry landscape, and with significant segment of technicians aspiring to enact new laws, we have a chance to make a difference during the upcoming BLS's 2028 SOC revision. By distinguishing between the educated technologists and on-the-job-trained technicians we can attract skillful newcomers at all levels of technical expertise needed to fill the void in the highly-skilled career that necessitates education, training, certification, and lifelong learning.

## References

References can be found at Budny, R. (August 2020). *Decoding Classifications: Implications, Impact, and Future of the BLS Occupation Designation for Dental Laboratory Technicians*. Inside Dental Technology. <https://itd.cdeworld.com/courses/5253-decoding-classifications-implications-impact-and-future-of-the-bls-occupation-designation-for-dental-laboratory-technicians>