CAD/CAM in the VA System

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Early visionaries in VA RR&D were responsible for advancing a proof-of-concept for prosthetics CAD/CAM into a commercial reality.

This fledgling industry garnered early successes and maintains a loyal following.

As with any new technology, manufacturers are ill-equipped to further it on their own.

The VA’s role remains vital to advance this technology to a higher level of efficiency, function, and utility.
Key research objectives

1. Implementation research in the VA clinical arena
2. Development of next-generation data input, socket design, and automated manufacture subsystems; smart systems
3. Incorporate recent understandings in prosthetics science into the CAD/CAM model
4. Garner further comprehension that will contribute to the efficiency, economy, and ease of use of CAD/CAM in prosthetics
1. Implementation Research

- The VA was the first to institute widespread installation and use of CAD/CAM and central fabrication
- An aggressive training schedule led to early implementation, but later decentralization of PSAS led to disparities in CAD/CAM utilization among the sites and a failure of some sites to meet productivity goals
1. Implementation Research RFP’s

- Survey existing CAD/CAM equipment; identify facilitators and barriers within VA healthcare system
- Evaluate existing VA CAD/CAM software and hardware
- Establish clinical service protocols for maximum efficiency
- Determine most appropriate software and hardware solutions for individual facilities
- Retool and modernize systems where appropriate
- Provide onsite training to match established procedures
- Perform studies to evaluate the efficient and sustained use of CAD/CAM through innovative implementation methodologies within the VA healthcare structure
While Otto Bock has generously offered to contribute to the VA CAD/CAM effort, it is imperative that systems from each manufacturer be evaluated based on their merit, potential, and conformance to the requirements to be established.
2. “Smart” CAD/CAM Systems RFP’s

- Smart CAD/CAM systems will streamline operations, increase accuracy, and provide decision support to the prosthetist
  - Upper and lower limb prescription aid for component selection
  - Automated feature recognition
  - Self-improving templates
  - Selectable modifications for manufacturer-specific interface components
  - Myo-electrode placement optimization
  - Cosmesis
  - Outcomes measurement and tracking
3. Prosthetics Engineering RFP’s

- Expand capabilities using add-in modules incorporating state-of-the-art fitting techniques and advancements in prosthetic science
  - Integrated alignment
  - “All-in-one” prostheses
  - Failure analysis
  - Bowden cable routing for hybrid upper-limb prostheses
  - Automatic electronic control adjustment
  - Functional characteristics of multiple components in a complete prosthesis
  - Advanced, automated fabrication of prosthetic limbs (i.e. elimination of positive models)
4. Basic research RFP’s

- CAD/CAM in the VA can improve prosthetic care by providing an avenue for implementation of advancements in the science of prosthetics
  - Tissue viability
  - Interface mechanics
  - Finite element analysis (FEA)
  - Medical imaging integration
  - Smart materials
  - Service life
  - International Standards Organization (ISO) standards
CAD/CAM Education

- CAD/CAM is a tool requiring its own skill-set; these skills are not being taught by the formal P&O educational programs
  - Energize and educate Certified P&O faculty in CAD/CAM training programs
  - Develop partnerships between the VA, residency training programs, and local P&O educational programs
  - Influence coordinated CAD/CAM standards among the accreditation committees, certification organizations, and professional societies
  - Augment existing CAD/CAM software with educational modules to allow comparison between student projects and an expert model
DoD/VA CAD/CAM Collaborations

CAD/CAM offers a unique facility for records management, as well as a challenge in data storage and retrieval

- Standardize CAD/CAM format of patient data files
- Addition of CAD/CAM data types to a centralized patient information database
- Seamless transfer of patient data to augment continuity of care within and between agencies
- Facilitate VA’s ability to provide backup capacity to DoD (or vice versa)
Challenges to progress

- The pool of experts in CAD/CAM research is small; current restrictions on extramural partnerships by the VA limit the achievement of these goals.
- Similarly, the requirement for a clinical P.I. in VA Centers of Excellence may preclude otherwise qualified research teams from responding to RFP’s.
Opportunity

Realization of these goals will provide prosthetists with unparalleled tools to provide the best quality of care to incoming wounded servicemen and women and veterans; tools that are not simply replacements for “rasp and plaster,” but a heretofore unachievable means to improve prosthetic outcomes.