Medical Conditions

Guidance for the Medical Evaluation of Law Enforcement Officers

provided by ACOEM

Amputations and Prosthetics
AMPUTATIONS AND PROSTHETICS

INTRODUCTION
The well-managed and well-motivated person with certain amputations may be capable of safe and effective job performance as a law enforcement officer (LEO). However, amputations may affect an LEO’s ability to safely and effectively perform a number of law enforcement job functions (see Appendix A for a discussion of the effect of amputations and prosthetics on LEO job performance/functions). For the purposes of this chapter, “amputation” refers to all forms of limb deficits, whether congenital or due to an amputation done for whatever reason.

All LEOs who have had an amputation or have a congenital limb deficit should have a full medical evaluation to address any underlying or associated disease process that led to the decision to perform an amputation or that caused the deficit. The underlying condition should be evaluated with reference to the relevant section(s) in these guidelines.

This document is intended to assist the police physician in performing an individualized assessment of an LEO with amputation or other limb deficits.

UPPER EXTREMITY AMPUTATIONS

LEOs Not Using Prostheses

Partial Amputation of Thumb at or Distal to Interphalangeal (IP) Joint
LEOs with adequate length of the thumb to form a side pinch against the index finger will likely be able to generate adequate grip and have adequate dexterity to safely and effectively perform law enforcement job functions. If due to the length of the remaining digit, there is a question about dexterity, it may be necessary to evaluate the LEO’s performance on task simulations.

Partial Amputation of Single Digit Other than Thumb at or Distal to Distal Interphalangeal (DIP) Joint
LEOs with partial single digit amputations at or distal to the distal interphalangeal joint (DIP) without any skin abnormalities (e.g., well-healed traumatic amputations or post-frostbite with no history or signs of skin breakdown or congenital lack) with or without normal function of the DIP, other than of the index finger, generally have very little impairment that would adversely affect performance of law enforcement job functions. LEOs with such amputations of the index finger should be individually evaluated for adequate performance of law enforcement job functions such as firearm use.

Partial Amputation of Multiple Digits Other than Thumb at or Distal to Distal Interphalangeal (DIP) Joint on Same Hand
LEOs lacking distal segments of multiple digits on the same hand should be assessed individually for ability to safely and effectively perform required law enforcement job functions. Such amputations may impair dexterity of manipulation tasks.

Digit Amputations Proximal to DIP Joints and Thumb Amputations Proximal to IP Joint
LEOs with the following amputations will most likely be unable to perform various hand grasping and dexterity tasks necessary to safely and effectively perform law enforcement job functions (see Appendix A):

● lack of thumb proximal to IP joint
  ▪ cannot close around object = power grasp
    ▪ hold baton
    ▪ use firearms
    ▪ retain weapons
    ▪ restrain suspects
    ▪ hold and manipulate steering wheel
- lack of two fingers on one hand at the PIP joints
  - index and long fingers – fine motor tasks
  - ring and small finger – power grasp
  - loss of one finger in each of these two groupings will likely partially impair both functions
- lack of one finger at the MCP joint AND the thumb of the same hand at the IP joint.
  - impairment depends on which finger is lost with the thumb
  - ability to compensate for loss of a digit is compromised with loss of the thumb at the IP joint

Amputations Proximal to Metacarpophalangeal Joints

Amputation of One Metacarpal
Single metacarpal amputations may still allow adequate functionality for performing law enforcement job functions.

Amputation of Two or More Metacarpals
Loss of multiple metacarpals will not allow performance of many law enforcement job functions. The police physician will need to provide appropriate work restrictions.

Amputations Proximal to Metacarpals
Loss of the extremity proximal to the metacarpals will not allow performance of many law enforcement job functions. The police physician will need to provide appropriate work restrictions.

LEOs Using a Prosthesis or Prostheses
At the time of this writing (2013), upper extremity prostheses do not provide LEOs with the multi-functionality of grip types necessary for performing law enforcement tasks. Additionally, these devises do not provide the LEO with the dexterity, strength, and proprioception that is necessary to perform several law enforcement job tasks. The police physician will need to provide appropriate work restrictions.

LOWER EXTREMITY AMPUTATIONS

LEOs Not Using Prostheses
Depending on the level of lower limb deficit and his or her individual level of rehabilitation, the LEO with some lower extremity deficits may be able to safely and effectively perform law enforcement job functions without a prosthesis. Generally, this will apply to LEOs with deficits no greater than a trans-metatarsal loss on one foot.

Toe Deficits
LEOs who lack any one toe or multiple or all toes generally would be able to safely and effectively perform law enforcement job tasks, although they may need shoe modifications.

Mid-foot Amputation

Single Ray Deficits
LEOs with single ray deficits involving one toe and the associated metatarsal may be able to safely and effectively perform law enforcement job functions.

Multiple Ray Deficits
LEOs with multiple deficits of a toe and the corresponding metatarsal may have difficulty safely and effectively performing law enforcement job functions. The police physician will need to provide appropriate work restrictions.
LEOs with a deficit above the metatarsal heads across the entire foot are likely to have difficulty safely and effectively performing law enforcement job functions. (There are several named mid- and hind-foot amputations as well as ankle disarticulations that fit into this general category – see Appendix A for a discussion of individual amputations.) The police physician will need to provide appropriate work restrictions.

**Transtibial and Proximal Deficits**
LEOs with transtibial deficits without a prosthesis will not be able to safely and effectively perform law enforcement job functions. The police physician will need to provide appropriate work restrictions.

**LEOs Using Prostheses for Unilateral Lower Extremity Amputations**

**General Prosthesis Use Considerations**

**Toe Amputations**
Toe prostheses are rarely used, except for the great toe, other than for cosmetic purposes. LEOs with toe amputations should be able to safely and effectively perform law enforcement job functions.

**Transmetatarsal Amputations**
LEOs with transmetatarsal amputations using a shoe modification should be able to safely and effectively perform law enforcement functions.

**Metatarsal-tarsal Junction and More Proximal Foot and Ankle Amputations**
LEOs with metatarsal-tarsal junction and more proximal foot and ankle amputations may have difficulty safely and effectively performing law enforcement job functions even with a prosthesis. The police physician will need to provide appropriate work restrictions.

**Transtibial Amputations**
LEOs with transtibial amputations using prostheses may be able to safely and effectively perform law enforcement job functions. They should be individually tested with tasks simulating actions involved in law enforcement job functions (see Appendix B for evaluation criteria).

**Knee Disarticulations**
LEOs with trans-knee amputations using prostheses may be able to safely and effectively perform law enforcement job functions. They should be individually tested with tasks simulating actions involved in law enforcement job functions (see Appendix B for evaluation criteria).

**Transfemoral Amputations**
LEOs with transfemoral amputations using prostheses may be able to safely and effectively perform law enforcement job functions. They should be individually tested with tasks simulating actions involved in law enforcement job functions (see Appendix B for evaluation criteria).

**Hip Disarticulation and Hemipelvectomy**
LEOs with hip and pelvis-level amputations using prostheses are unlikely to be able to safely and effectively perform law enforcement job functions. The police physician will need to provide appropriate work restrictions.

**MUltiple Extremity Amputations**
LEOs with multiple extremity amputations, other than toes and fingers as noted above, are likely to have greater difficulty performing law enforcement job functions than persons with single extremity amputations. Any LEO with multiple extremity amputations should be evaluated for his or her ability to safely and effectively perform job functions (see Appendix B for evaluation criteria).
**PROSTHESIS-RELATED ISSUES**

**Prosthesis Function**
LEOs using a prosthesis should be required to monitor the condition of their prosthesis.

LEOs using a prosthetic should report to their supervisor if they are experiencing any malfunction in the prosthesis that might affect their ability to safely and effectively perform expected job functions just as any other officer should report conditions that might adversely affect their ability to safely and effectively perform job functions.

**Prosthesis Socket Fit**
The ability of an LEO using a prosthesis to perform the essential law enforcement job junctions should be assessed only AFTER the LEO has been fit for and is using his or her definitive prosthesis.

**Service/Prosthesis Function**
LEOs using prostheses should be required to follow recommended service plans as put forth by the manufacturer, their treating prosthetist, or national professional organizations. The creation of a service plan should take into consideration the LEO’s job functions. Records of such services and any repairs should be provided in a timely manner to the police physician for review.

Any service for breakage or mechanical failures should be accompanied by a full report from the servicing agency as to likely cause and actions taken or recommended to minimize the risk of future acute failure.

Any change in prosthesis from the one used for clearance to duty should mandate re-evaluation.
APPENDIX A: DISCUSSION OF AMPUTATIONS

Functional capability of persons who have had an amputation or were born with hypoplastic extremities depends on multiple factors related to the level of limb deficit, reason for the deficit, person’s overall health, functional capabilities of any available prosthetic devices, and their ability to learn to perform activities with a prosthesis.

I. Amputation and the Courts

The courts have viewed hiring policies that disqualify amputees – without providing them with an individualized evaluation (see Appendix B for evaluation criteria), in relation to the job position being sought – as discriminatory under the Americans with Disabilities Act and other statutes prohibiting discrimination against persons with disabilities. Many, though not all, persons with limb deficits are likely to qualify as disabled for purposes of being covered by anti-disability discrimination legislation.

II. Amputation and Law Enforcement Job Functions

Existing task-based assessments designed to assess an amputee for certain occupations (e.g., Federal Motor Carrier Safety Administration, U.S. Coast Guard, Federal Aviation Administration) do not easily translate to the complexity and time sensitivity of law enforcement job functions, nor to the unpredictability and environmental challenges of the settings in which these tasks must be accomplished. There are currently no studies that address return to duty of law enforcement officers (LEOs) following amputations. Law enforcement activities have some significant similarities to military ground soldier activities in that LEOs must operate in a variety of terrains (e.g., navigating obstacles and responding rapidly on foot) and use weapons. A 2010 study of U.S. military personnel who sustained an amputation in the Iraq or Afghanistan wars reported a return-to-duty rate of 16.5% overall. If the definition of “return to duty” from Physical Evaluation Board final disposition of “fit for duty” or “return to duty” (the only two designations that are completely unrestricted) is used, the return-to-duty rate for Iraq and Afghanistan veterans with an amputation is 2.8%. This study did not document the actual roles (i.e., what physical activity profiles) to which the amputee personnel returned.

III. Congenital Limb Deficits and Early-life Amputations

Persons with congenital limb deficits, as well as those with early-life (pre-adolescence) amputations, may achieve significantly higher levels of overall functionality than persons experiencing amputations later in life. This higher level of function in activities of daily activity and/or recreational activities should not be assumed to indicate that the person with an amputation can perform LEO essential job functions. (The remainder of this discussion on assessment of amputations, unless otherwise stated, also includes LEOs with congenital deficits and early-life amputations.)

IV. Overview of Medical Evaluation of Amputees

The police physician may need to advise the department or authority having jurisdiction (AHJ) on what types of activities are most likely to be adversely affected by the amputation.

- Prior to release to unrestricted duty, the LEO with an amputation should undergo evaluation by the department for ability to perform job functions to department-defined adequacy (e.g., firearm qualification tasks and scores or pursuit driving proficiency on a department-designated course) that are likely to be affected by the amputation.
- Any evaluation must take into account the disease process or event that led to the amputation.
- As a part of the overall assessment for ability to safely and effectively perform law enforcement job functions, the LEO should have to submit to an agency-determined evaluation of ability to actually perform job functions prior to final clearance to full duty.

In the U.S., health care providers and payers rely exclusively on the Medicare Functional Classification Level (MFCL), aka K-levels (see Appendix C), to predict functional capacity of amputees for determination by Medicare and other insurers of what types of prosthetic components they will cover for lower limb amputees. This classification system is not designed to document the amputee’s physical abilities. Additionally, this classification...
system is not used for assessing upper extremity amputees. Existing fitness-for-duty evaluations for amputees and their limitations in certifying individuals for complex work environments has been recently reviewed.³

The treating physiatrist or other physician knowledgeable about amputee management and a certified prosthetist (if the amputee utilizes a prosthesis) should provide evaluation forms (see Appendices D and E) to the police physician documenting the amputee’s general health, underlying reason for the amputation and the type, and specifications and maintenance history of the prosthetic device. The treating physician and prosthetist should complete and submit the information requested in these forms following any revision, change, modification, or re-evaluation of the prosthesis.

For the LEO who does not use a prosthesis, the evaluation should be based on his or her ability to do the job functions without a prosthesis. For an LEO who uses a prosthesis, the evaluation should be based on his or her ability to do the job functions while wearing any prosthesis that would be used at work. If the LEO has an older model “back-up” prosthesis that is used when the primary prosthesis is being serviced, an evaluation for functional capabilities should be performed with that prosthesis as well if it will be used while on the job.

All prostheses are built with some leeway in fit to accommodate normal changes in residual limb size. Residual limb/socket fit changes are more of a concern for newer amputees whose residual limb is still remodeling and after major illness and/or weight loss or gain, and less of a concern for upper extremity amputees, congenital amputees, and/or amputees who have worn their prosthesis for several years. The incumbent LEO should be placed on restricted duty until assessed by his or her prosthetist for prosthetic fit and possible socket modification or socket replacement. Repeat evaluation of the LEO is required by the police physician after substantial technology changes (changes to foot, knee, terminal device, suspension system, socket) or any incident of prosthetic failure or loss of prosthesis (either spontaneously or during job or other life activities).

All prostheses require both scheduled and episodic maintenance. LEOs usually rely on a back-up prosthesis (typically a previous prosthesis with a duplicated socket/older components or an adaptive sports prosthesis) while their current prosthesis is being serviced. The LEO and police physician should have a clear understanding that fitness for duty is based on use of the prosthesis worn for any functional assessment. Any back-up prosthesis the LEO wishes to use for unrestricted duty should be subject to the same evaluation by the police physician and prosthetist as the primary prosthesis.

A review of the literature does not reveal a definable failure rate for either upper or lower extremity prosthetic devices or for device-patient interfaces (sockets and harnesses). Since these are mechanical devices, there is reasonable concern, however, that with time and heavy use, there may be increased risk for device failure. Thus, it is important for the police physician who clears the LEO with an amputation for return to duty to establish scheduled follow-ups that include assessment of the prosthesis components by a certified prosthetist.

Following amputation, there is no standard rehabilitation time noted for attempting physical activities similar to law enforcement job duties. A reasonable time frame from surgery to fit of the definitive prosthesis is approximately 6 months for a traumatic amputee with no comorbidities; the time frame may be longer for vascular, neoplastic, and/or infectious causes of amputation.⁶ However, after this time period, the amputee may need many more months to learn how to most effectively and efficiently function with the prosthesis.

Lower extremity amputees generally automatically select the step length that minimizes energy expenditure.⁷ Unilateral below-knee amputees are estimated to have 9-28% (3.3-3.8 METS) increase in energy cost compared to normal ambulation (3 METS). Unilateral above-knee amputees experience a 40-65% (4.2-5.0 METS) increase in energy expenditure during ambulation.⁸ Therefore, the LEO with a lower-extremity amputation will experience a higher level of energy expenditure for some law enforcement job functions than the LEO without limb loss.
Congenital limb and early childhood amputees who adopt prostheses early in life are likely highly proficient prosthetic users. This group of highly active amputees may utilize very specialized equipment of their own design to compete in sports from track and field to rock climbing and triathlons. Such athletic amputees may be comfortable devising and maintaining their own specialized prostheses. The LEO must, however, be evaluated in the prosthesis that will be worn during work. Performance in an activity specific device is not generally transferable to LEO job functions. Commercially manufactured activity specific prostheses of any type are also usually not appropriate for unrestricted LEO duty.

V. Upper Extremity Amputations
Seventy percent of upper extremity amputations are of traumatic etiology. Upper extremity amputations are classified by anatomical terminology – transphalangeal, transmetacarpal, transcarpal, wrist disarticulation, transradial, elbow disarticulation, transhumeral, shoulder disarticulation, and forequarter (arm, scapula, and clavicle). Amputation of the upper extremity at or proximal to insertion of deltoid insertion is regarded as 100% impairment of the extremity.

Two types of grip – power and pinch – are of importance to law enforcement job function. Normative data exists for power grips (cylindrical, spherical, hook/palmar) and pinch grips (tip, chuck, and lateral pinch). For example, LEOs must be able to restrain resisting persons with one hand while using the other hand to perform tasks such as hold and activate a radio or manipulate handcuffs in removing them from their holder and applying them to the suspect.

For most individuals who do not have a functional hand, the most efficient prosthesis (prosthesis defined as a device to replace a missing body part) is usually the remaining opposite limb. Upper extremity prostheses are only expected to generate forces adequate for manipulation of light objects. While custom-made terminal devices can be used to accomplish certain heavy-duty tasks (i.e., volar wrist splint allowing fixation of a hammer for a patient thumb/fingers), these devices are task-based and require accommodations that allow the tool to be directly fixed to the socket. While many terminal devices exist to facilitate completion of activities of daily living (ADLs) or specific tasks, even the best prosthesis does not replace tactile sensation. A typical body-powered shoulder harness has the ability to carry approximately 4 pounds in the terminal device while maintaining elbow-flexion. Locking the elbow and substituting whole body movements will allow lifting of heavier items. Myoelectric devices face similar lifting limitations in addition to being heavier and requiring ready access to a power supply.

The police physician should take into account the ability to perform specific job functions required by the AHJ:
- apprehending/restraining/handcuffing a struggling, resisting suspect;
- using weapons safely and effectively;
- using a weapon while simultaneously using radio;
- using two handed weapons;
- emergency driving;
- driving while simultaneously operating the radio or other in-vehicle instruments;
- using flashlight, opening doors or performing other upper extremity tasks while holding a weapon with the other hand;
- weapon qualifying with both hands individually; and/or
- weapon retention.

LEOs being considered for release to full duty should undergo evaluation of capability to perform law enforcement job functions. This may be accomplished by the department requiring that the person satisfactorily complete functions in a department-based setting such as a training facility. Alternatively, this may be accomplished with a medical functional capacity examination with tasks ordered by the physician following consultation with the department regarding job functions. Testing should not include job functions that are not required of other officers without a prosthesis.
VI. Lower Extremity Amputations

Lower extremity amputations account for one third of traumatic amputations. The vast majority of lower extremity amputations are attributed to dysvascular causes. The underlying condition/event resulting in the lower extremity amputation (e.g., diabetes, neoplasm, peripheral vascular disease, blast, penetrating or blunt trauma) may also affect decisions regarding the LEO’s ability to safely and effectively perform his or her job functions.

Lower extremity amputations are classified by anatomical terminology. Toe amputations, ray amputations (counting from big toe as the first), midfoot (metatarso-phalangeal, transmetatarsal), tarsometatarsal disarticulation (Lisfranc), transtarsal (Chopart – between talus/calcaneus and distal row of tarsal bones) are all considered partial foot amputations. The Syme’s amputation is an ankle disarticulation with reattachment of the calcaneal fat pad. Transtibial (below knee), knee disarticulation, transfemoral (above knee), hip disarticulation, and transpelvic amputation or hemipelvectomy each has its particular issues regarding rehabilitation and activity capabilities. Problems encountered include:

- Syme’s amputations present problems for fitting any sort of functional prosthesis due to length of the residual limb.
- Transtibial or below-knee amputations (BKA) can be classified by tibial length (very long, long, short, very short) as the size/shape of the residual limb is important in predicting the ability of the amputee to obtain a well-fitting prosthesis. Long and very long BKA residual limbs may present problems for prosthesis fitting due to the length of the residual limb. Very short BKA residual limbs may present problems with socket fitting.
- Knee disarticulation prostheses extend upper leg length while in a sitting position which may interfere with sitting, entering/exiting a vehicle, or other close quarters work setting, and may impair the ability to kneel.
- Transfemoral or above-knee amputations (AKA) are classified by femoral length (long, short). An AKA with a very long residual limb may present problems for fitting any sort of functional prosthesis due to the length of the residual limb. In contrast to a BKA, the mechanism of walking with an AKA prosthesis requires using the hip muscles to control the knee. This is opposite of normal gait. Learning to walk with an above-the-knee prosthesis requires formal physical therapy to learn effective technique.

Persons with any of the following amputations are unlikely to be able to be fitted with a prosthesis that will restore adequate functional capabilities to permit the wearer to safely and effectively perform law enforcement job functions:

- above the knee proximal to 5 cm from perineum;
- hip disarticulation;
- transpelvic amputation;
- hemipelvectomy.

The following are some job function issues that the police physician needs to consider when evaluating an LEO with lower extremity amputations:

- entering/exiting a vehicle;
- driving;
- walking/standing/kneeling for prolonged period of time;
- short-burst running on uneven terrain including up and down inclines and over obstacles with lateral stepping (zig-zag running to negotiate around obstacles);
- climbing over obstacles;
- crawling;
- rapidly going up and down stairs;
- walking backwards, sideways and with lateral crossover step;
- apprehending and restraining resisting suspects; and
- ability to wear regulation footwear if required.
Examination of the law enforcement officer (LEO) with an amputation involves addressing several aspects of the health of the affected limb(s) as well as the general health of the individual. The following list highlights some specific issues that should be addressed:

- **Physical health of the affected limb.**

- **Residual Limb Length** – Length is a marker of ability to achieve acceptable fit. Long residual limbs present a problem with achieving symmetry in length with the opposite limb. Short residual limbs present a problem with having enough tissue for the socket of a prosthesis to achieve adequate stability.
  
  Common problem residual limb lengths include:
  - Below the knee in the distal 2/5 of the tibia
  - Below the knee less than 3 cm from tibial tubercle
  - Above the knee less than 5 cm from the ischial tuberosity

  This is an issue more relevant to the rehabilitation team and likely to be resolved prior to any evaluation for law enforcement duties. However, as a factor in understanding potential failure points in the human/device interface, the concept should be understood and addressed in the examination.

- **Skin Health** – Residual limb skin problems have been shown to be present in up to 70% of young, active amputees. Non-weight-bearing surfaces represent potential areas for skin breakdown, often tied to poor prosthesis fit. Common sites include the anterior surface of midfoot, malleoli, distal tibia, fibular head, tibial crest, distal femur.
  
  Evidence of active or healed pressure ulcers suggests problems with prosthesis fit. Active pressure ulcers may preclude regular use of the prosthesis and require frequent periods of no prosthesis use. The skin overlying healed pressure ulcers is more prone to repeat breakdown than skin that has never had an ulcer.
  
  Verrucous hyperplagia, wart-like lesions on the end of a residual limb due to proximal “choking” of the residual limb, indicates an ill-fitting prosthesis.
  
  Chronic cellulitis, folliculitis, and/or fungal infections may preclude daily or longer duration (e.g., overtime) prosthesis use. The skin of the residual limb as well as the padding in the prosthesis socket should be examined for evidence of staining from skin wound drainage.
  
  Epidermoid cysts, noted as deep subcutaneous round or oval, initially non-tender lesions, more commonly along the point of contact of the prosthesis brim of transfemoral prostheses, these cysts may enlarge and eventually become tender and/or erupt leaving an open sore.
  
  Scar adhesion to deeper tissues at the surgical site, which may create shear points and symptomatic neuromas, should be documented.

- **Range of Motion in Remaining Joints** – Any contracture at the next proximal joint will adversely affect prosthesis fit and prosthesis/patient function and energy expenditure and will require job task functional assessment. A flexion contracture of greater than 20° generally makes fitting of the prosthesis difficult. A contracture of less than 20° may allow prosthesis fitting, although it may still adversely affect function to the point of the LEO being unable to safely and effectively perform necessary law enforcement job functions.
Pain – Poorly controlled residual limb pain and/or presence of symptomatic neuromas may adversely affect fit and wear time of the prosthesis as well as introduce mental distraction from mission objectives. Additionally, medications used to treat phantom pain may have performance implications (see Medication chapter). At the time of this writing, gabapentin, amitriptyline, venlafaxine, topiramate, levetiracetam, and carbamazepine are commonly used to treat residual limb pain.

*NOTE:* Since a number of the phantom pain medications are also anti-epileptic drugs and many amputations are associated with multiple trauma events, it should be verified that the medications have not been prescribed for treatment of a concomitant seizure disorder.

Gait – Gait reflects proper fit and alignment of prosthetic components. Many gait deviations can be addressed by adjustments to the prosthesis. Once all prosthetic mechanical and fit issues have been addressed, persistent gait abnormalities are likely to be associated with contractures or muscle weakness in the residual limb.

On-going Reassessment – An amputation is the beginning of a life-long relationship between a person and their rehabilitation team. The LEO should be required to have regular follow-up with the police physician, to supply either medical records or summary notes from any medical care related to the residual limb or associated conditions and to notify the police physician of any adverse developments in personal health, residual limb health or prosthesis function. Prosthesis service records for the last year or since fitting of the current prosthesis should be submitted as well.
APPENDIX C: PROSTHETICS CONSIDERATIONS

Prosthetics continue to evolve in terms of functional capabilities, socket design, and increased opportunities for persons with an amputation to participate in recreational and occupational activities. However, the advances in prosthetic design have not achieved the level where a prosthetic limb serves as a true replacement of the limb that was lost. The following discussion highlights some of the limitations of current prosthetic technology in the context of the varied, occasionally high-demand essential job functions of a law enforcement officer (LEO).

- The police physician should not equate an amputee’s sports-specific performance with the ability to safely and effectively perform essential law enforcement job functions. Most obviously, adaptive sport performance requires modifications to the existing prosthesis or a sports-specific prosthesis (i.e., for running, swimming, skiing). For example, while it may be reasonable for the LEO with an amputation to complete a 1.5 mile run wearing a running prosthesis as part of the agency’s standard physical test to document cardiopulmonary endurance, this type of prosthesis is unlikely to be optimal for other non-running tasks.

- Suspension systems/liners require washing and adequate air-drying time between wears. Lower extremity prosthesis wear-time is usually around 10 hours per day before the residual limb needs time to recover. Obtaining an extra silicon liner/suspension system may allow for longer duty assignments, although residual limb health is a continued concern. The residual limb should be washed and air-dried daily, which may be difficult with extended duty assignments. Prolonged heat and cold can also affect performance of various prosthetic components.

- The risk of unanticipated prosthetic dislodgement is unknown; however, a redundant suspension system should be discussed. Residual limb size may fluctuate with changes in outside temperature, thus affecting fit and requiring a break in activity to add or remove liner layers.

- Myoelectric limbs are powered by rechargeable batteries with battery life time ranging up to several days for some knee units. Adequate time between duty assignments is required for charging of the myoelectric limb. In general, myoelectric prostheses have alarm systems to warn of low battery charge. The reserve time from warning to assuming a default state should be considered. In most knee prostheses, the battery exhaustion default state is a locked extension stance position while others revert to a passive hydraulic status. Either of these defaults would change the prosthesis characteristics in terms of any prior evaluation of the wearer being able to safely and effectively perform law enforcement job functions and may then be considered incapacitation. Upper extremity myoelectric prosthesis battery life is generally less than in leg components. Prostheses may also use mechanical or battery-powered vacuum suspension systems. Loss of vacuum may lead to improper fit of the prosthesis and in turn, decreased performance.

- The latest prosthetic technology is not covered by traditional civilian health insurance due to the prohibitive costs of the newest components. Latest technology is often only available to persons injured in active duty military service or select workers’ compensation cases. At this time, prosthetic technology requiring implantable interfaces and/or targeted reinnervation is available only in specialized research settings.

It is also important that the police physician recognize that most prosthetics are classified by the Food and Drug Administration (FDA) as exempt Class I medical devices and thus are excluded from most FDA safety and effectiveness requirements. This classification allows the manufacture to be exempt from the collection of clinical data, thus making it difficult to find peer-reviewed scientific studies that prove the superiority of one prosthetic design or prosthetic component. Prostheses are also custom designed for each individual user. Therefore, it is unlikely that any specific recommendations can be given regarding the design and components of an ideal LEO prosthesis.

Different models from different manufacturers often have dissimilar functional profiles in terms of strengths and weaknesses. Thus, it is important that a certified, knowledgeable prosthetist be involved in the evaluation of prosthetic users for law enforcement positions. It is equally important that the police physician communicate clearly with the prosthetist regarding the law enforcement job functions in a manner that will help the prosthetist either evaluate the capabilities of a current prosthesis or advise an alternative. A listing of some job functions that may be affected by prosthetic use is provided in the forms for physician and prosthetist evaluation in Appendices D and E.
I. TO THE EXAMINING PHYSICIAN —

Please read the following introductory information to assist with your assessment:

The well-managed and motivated amputee may be capable of safe and effective performance of law enforcement officer (LEO) job functions. For the purposes of this discussion and for the evaluation “amputation(s) refers to all forms of limb deficits, whether congenital or due to amputation for whatever reason. Law enforcement entails a unique set of job functions that need to be considered in regards to those with an amputation who may or may not utilize prosthesis.

These may include (depending on the duties of the particular LEO position):
- Running, often over uneven terrain and obstacles, with sudden changes in direction and stops/starts necessary;
- Rapidly ascending multiple stairs of various construction types and shapes (e.g., rectangular tread, spiral wedge tread) and rapidly descending multiple stairs without the aid of hand support on banisters (potentially needing hands for equipment or restraining suspect);
- Scaling various higher obstacles such as fences of different construction;
- Jumping down from heights up to several feet (e.g. porches, loading docks);
- Grabbing, grasping, as in holding clothing or body parts of suspects to gain control;
- Grappling in hand-to-hand struggle with struggling, resisting suspects (requiring stable stance and rapid stance/weight distribution changes);
- Forceful twisting and torquing with hands as part of restraining struggling, resistant persons;
- Removing handcuffs from holder and applying them to resisting suspect while restraining with opposite hand;
- Driving either on patrol or emergency response or pursuit while operating in-vehicle instruments such as radio;
- Safely and effectively handling weapons;
- Brief periods of maximal physical exertion;
- Shift schedules over 8 hours;
- Work outdoors in hot and cold environments;
- Immersion in water.

II. Physician Assessment

The LEO being evaluated should be under the care of a physician knowledgeable about amputations and amputee medical management. Outpatient and in-patient record(s) of the last three years or since date of amputation (whichever is shorter) should be reviewed by the treating physician and provided to the police physician.

1. My credentials as a physician knowledgeable about amputee medical management are as follows (or attach CV):

2. Please provide a clinical description of the type of amputation (ex: left trans-radial amputation, right below knee amputation, etc.) the person has:
3. Age at time of amputation (in years)________________________

4. Date of amputation(s)________________________________________

5. What was the underlying cause of the amputation (check all that apply):
   □ Dysvascular □ Trauma-related □ Cancer-related □ Congenital
   Other (specify):______________________________________________

6. Was the limb revised at any time? □ Yes □ No
   If yes, how many times was the limb revised and when?________________________

7. Have there been any problems with the residual limb healing? □ Yes □ No

8. Is this patient taking any medications for neuropathic, chronic, or phantom limb pain? □ Yes □ No
   If yes, please indicate the current medications, starting date, and dosage:
   __________________________________________________________
   Are any of these medications being used to treat other disorders concomitantly such as seizures or depression? □ Yes □ No
   If yes, please explain:
   __________________________________________________________

9. Does this patient use a prosthesis? □ Yes □ No If yes, for how long?________________________

10. Are you aware of any complications within the past 12 months (e.g., skin breakdown interfering with proper fit of prosthesis, contractures, extreme fluctuations in size/shape of residual limb, neuropathic/phantom limb pain, etc.) or failure of prosthetic components, including battery failure if using a myoelectric prosthesis? □ Yes □ No
    If yes, please describe the event(s) and subsequent steps taken to minimize the possibility of reoccurrence:
    __________________________________________________________
    __________________________________________________________

11. Has the patient been educated about residual limb care and prosthetic management and demonstrated knowledge of procedures that should be followed for proper care and use of the prosthesis and what to do if complications arise? □ Yes □ No

12. Are you aware of any other medical conditions that would interfere with the person’s ability to perform the job functions of a law enforcement officer as noted above, but not limited to those listed above? □ Yes □ No
13. For patients with upper extremity amputations

Does the patient use a prosthesis? □ Yes □ No

Does the patient have adequate POWER GRIP and PREHENSION FUNCTION of the HAND to perform tasks such as holding, clutching, clasping, or seizing firmly the steering wheel or other vehicle/police equipment, apprehending/restraining a suspect, etc.?

With the prosthesis they intend to wear at work if one used?

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Without prostheses?

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14. For patients with lower extremity amputations

Does the patient utilize a prosthesis? □ Yes □ No

Does the patient have adequate STRENGTH, BALANCE, and STABILITY to perform tasks such as running in pursuit, sprinting short distances at high speed, dodging, pushing/dragging/pulling heavy loads, crawling, climbing, and operating a motor vehicle?

With the prosthesis they intend to wear at work?

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I. Introduction

The well-managed and motivated amputee may be capable of safe and effective performance of law enforcement officer (LEO) job functions. (For the purposes of this discussion and for use of the evaluation form, “amputation” refers to all forms of limb deficits, whether congenital or due to amputation for whatever reason.)

For those LEOs with an amputation and who use a prosthesis, law enforcement entails a unique set of job functions that need to be considered. Depending on the duties of the particular LEO position, these job functions may include:

- Running, often over uneven terrain and obstacles. with sudden changes in direction and stops starts necessary;
- Rapidly ascending multiple stairs of various construction types and shapes (e.g., rectangular tread, spiral wedge tread) and rapidly descending multiple stairs without the aid of hand support on banisters (potentially needing hands for equipment or restraining suspect);
- Scaling various higher obstacles such as fences of different construction;
- Jumping down from heights up to several feet (e.g., porches, loading docks);
- Grabbing, grasping, as in holding clothing or body parts of suspects to gain control;
- Grappling in hand-to-hand struggle with struggling, resisting suspects (requiring stable stance and rapid stance/weight distribution changes);
- Forceful twisting and torquing with hands as part of restraining struggling, resistant persons;
- Removing handcuffs from holder and applying them to resisting suspect while restraining with opposite hand;
- Driving either on patrol or emergency response or pursuit while operating in-vehicle instruments such as radio;
- Safely and effectively handling weapons;
- Brief periods of maximal physical exertion;
- Shift schedules over 8 hours;
- Work outdoors in hot and cold environments;
- Immersion in water.

II. Prosthetist Assessment

1. My credentials as a prosthetist knowledgeable about prosthetics and prosthetics users are as follows (or attach CV):

2. Are you aware of any complications within the past 12 months or since beginning use of prosthesis (e.g., skin breakdown interfering with proper fit of prosthesis, extreme fluctuations in size/shape of residual limb, neuropathic/phantom limb pain, etc.)? □ Yes □ No

If yes, please describe the event(s), subsequent steps taken to minimize the possibility of re-occurrence and provide the office records related to those events and actions taken:
3. Are you aware of any failure of prosthetic components within the past 12 months, including battery failure if using a myoelectric prosthesis? □ Yes □ No

If yes, please describe the event(s), subsequent steps taken to minimize the possibility of re-occurrence and provide the office records related to those events and actions taken:

________________________________________________________________________

________________________________________________________________________

4. Based on your clinical experience with the patient, is it your medical opinion that the amputation and/or prosthetic prescription will likely remain stable over the next year? □ Yes □ No

5. Has the patient been educated about residual limb care and prosthetic management? □ Yes □ No

6. Has the patient demonstrated knowledge of procedures that should be followed for proper care and use of the prosthesis and what to do if complications arise? □ Yes □ No

7. Please provide a detailed description of the prosthesis:

________________________________________________________________________

________________________________________________________________________

8. Please provide your recommended maintenance/re-evaluation schedule for this patient:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

_________________________________________  ______________________________
Signature of Prosthetist                      Date

_________________________________________  ______________________________
Printed Name of Prosthetist                  Phone
REFERENCES