Amputation and Life Care Planning
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History
• Recorded from beginning of written history
• One of the first books: 1517 (by Gersdorff I)
• 1561- Pare’ first known prosthetic leg with an artificial joint
• 1696- first known transtibial prosthesis with an unlocked knee joint
• 1863- Suction socket patented in US- uses pressure to suspend the prosthetic limb

Amputation Basics
• In 1996 (although some data updated 2006), 1.9 million + with limb loss (not including fingers and toes)
• One in 200 has some sort of amputation
• About 20,000 ~ 30,000 new per year
• Most ages 50 - 70
• Most are men (about 75%)
• About 85% are lower limb
• Most amputations due to vascular disease
• Second most common is due to injury (including electrical)
• Other causes: Infection, tumors, nerve injuries and congenital deformities
(See following slides for categories)

http://www.amputee-coalition.org/fact_sheets/amp_stats_cause.html
Amputation-Classifications

- Trauma
- Tumors/Cancer
- Congenital Limb Deficiency
- Vascular
  - PVD-Peripheral Vascular Disease
  - DM-Diabetes Mellitus

Trauma Related

- Most trauma related amputation are to the upper extremity (~68%)
- More men than women
- Compound fractures, burns, stabs, gunshot wounds, compression injuries
- War zones, landmines
- Work and traffic related accidents
- Natural disasters
- Frostbite
- Infections post trauma or surgery

Tumors/Cancer

- Presentation: swelling/pain
- Bone tumors represent 1/2
  - Soft tissue and skin tumors
- Chemotherapy or radiotherapy
- Infection or tumor regrowth can lead to amputation
- Only small number need amputation
- More complicated amputations
  - Transfibular amputation- AKA
- Younger age
- Cancer related ~3/4 lower extremity
Congenital Limb Deficiency

- Child born with partial or complete absence of one or more limb(s)
  - Transverse—limb only develops to a certain level
  - Longitudinal—absence of bone within the axis of limb
- Occurs in 50 out of 100,000
- Not one specific cause—can be unexpected drug reaction
- First prosthesis at 6-8 mo.—early attempts to stand

Peripheral Vascular Disease (PVD)

- Diseases of the blood vessels
  - Diabetes Mellitus
  - Atherosclerosis
- Almost all BKA
- Greater for people over 60 years old
- Largest cause of amputation

Atherosclerosis

- Plaques deposited in any artery
- Gangrenous foot usually leads to amputation
- Vascular disease
Diabetes Mellitus (DM)

- High incidence of amputation
- Blood glucose levels intermittently raised above normal
- Complications cause small blood vessel damage
  - vision impairment, renal failure, impaired sensation in hands/feet
- Non-healing ulceration in feet can result from poor circulation

Diabetes Mellitus

- High glucose level in wounds encourage bacterial growth/infection which may lead to gangrene
  - Sometimes partial foot amputation possible, but site may not heal—at this point usually needs full amputation
- Have a higher postoperative mortality rate of 8x the expected rate during first year, and 30-50% rate of secondary amputation at 3 years

Surgery

- Goal is to provide a residual limb suitable for prosthetic fitting
- Want the best length with soft tissue covering
- Preserving knee joint/elbow joint shows greater success rate for functional prosthetic use
Post-surgery Care

- Must care for wound after surgery!
  - Residual limb complications occur from open wounds, bone infections, exostosis (non-cancerous bone growth on bony surface), dermatitis, and soft tissue lesions
- Wash limb daily and examine skin for chafing
- Weight gain affects fit and function

Prosthetic Rehabilitation

- Not the goal for all amputees
  - Refer to Medicare "K" levels
- Consider factors:
  - Age—largest prognostic factor influencing poor mobility in AKA is greater when age 65+
  - Is mobility attainable?

Types of Amputation: Upper Extremities

- Hand and Partial-Hand Amputations: Includes finger, thumb or portion of the hand below the wrist.
- Wrist Disarticulation: The limb is amputated at the level of the wrist.
- Transradial (below elbow amputations): Any amputation that occurs in the forearm, from the elbow to the wrist.
- Transhumeral (above elbow amputations): Any amputation that occurs in the upper arm from the elbow to the shoulder.
- Shoulder Disarticulation: An amputation that is at the level of the shoulder, with the shoulder blade remaining. The collarbone may or may not be removed.
- Forequarter Amputation: A shoulder disarticulation amputation in which the shoulder blade and collar bone are removed.
**Functional Limitations (Upper Extremity)**

- Manual/finger dexterity
- Bilateral dexterity
- Eye-hand coordination
- Gripping
- Grasping
- Lifting
- Carrying
- Sensory (feeling)

**Other functional limitations**

Decreased strength
Decreased stamina
Environmental constraints
  (wet, dusty, gritty)
Temperature tolerance

(Weed & Sluis, 1990)
Functional Expectations for AE&BE

• Independent in donning and doffing the prosthesis
• Independent in activities of daily living
• Can write legibly with remaining hand
• Has successfully switched dominance (if necessary)
• Drives (if desired)
• Has returned to work (same or modified job)
• Can tie laces with one hand or with the remaining hand and the prosthesis
• Uses a button hook easily
• Has prepared a meal in the kitchen
• Has been shown adaptive equipment for the kitchen and ADL
• Has performed carpentry and automotive maintenance (if desired)
• Wears prosthesis during all waking hours
• Uses the prosthesis for bimanual activities
• Understands the necessity of follow-up